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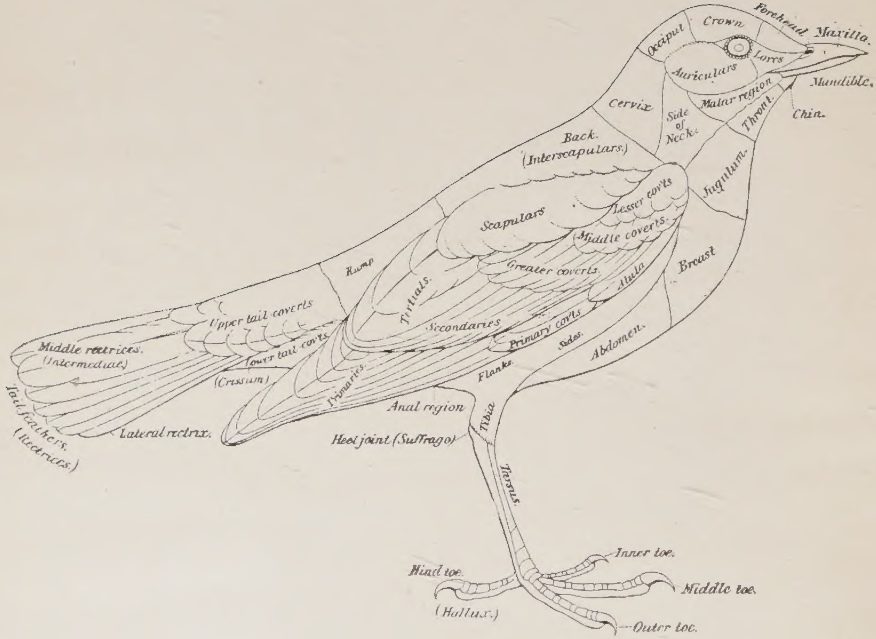

Plate I. The Topography of a Bird.
From Ridgway's Nomenclature of Colors, 1886.

MICHIGAN BIRD LIFE

A List of all the Bird Species known to occur in the State together with an outline of their Classification and an account of the Life History of Each Species, with special reference to its Relation to Agriculture. With Seventy Full-page Plates and One Hundred and Fifty-two Text Figures

BY

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Curator of the General Museum

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PREFACE.

The last general work on Michigan birds was prepared by Professor A. J. Cook and published in 1893 as Bulletin 94 of the Michigan Agricultural Experiment Station. It professed to be little more than a list of the birds of the state, with some indication of distribution and abundance, but without descriptions of plumage and with only occasional reference to habits. Limited as was its scope it was a welcome contribution to our bird literature, and since the supply was exhausted, in 1900, requests for another bulletin have been received in ever increasing numbers.

The present work has been prepared in response to a demand not only for an authoritative list of Michigan birds but for such additional information about each species as would be useful and interesting. Perhaps it is too much to hope that this demand will be fully satisfied by the present volume, but an examination of its pages will show that an attempt has been made to give the main facts in the life history of each bird found in the state, although in many cases the material has been so abundant that much was necessarily omitted, and the remainder closely condensed. The primary aim has been to put this information in such form as to make it readily intelligible to the average citizen; not too technical to be readily understood by the layman, nor so elementary as to suggest the nature-study primer.

With the hope that the book might appeal to the student and teacher, as well as to the nature lover and general reader, careful descriptions of all species have been incorporated and artificial keys are provided so that any person with a freshly killed bird, or a prepared specimen in hand, may be able to trace it out and "classify" it just as some of us learned to name flowers in the days when such work was believed to be a necessary part of any course in botany.

Most of these keys have been tested for several years with college classes, and while far from perfect they will be found "workable" in most cases. They differ from other similar keys in the greater use made of measurements, and the lesser dependence placed on mere color, which varies greatly in some species with age, season and sex. Those interested in the use of these keys will find suggestions and explanations on pages 12 to 20 of the introduction.

It seemed eminently proper in a book of this kind, originating in, and published by, an Agricultural College, that special attention should be given to those species which directly affect the farmer's interests, which help in the struggle against insect enemies, or which at certain times and places may themselves levy tribute on his orchards and fields. No one section of the book has been given up to this subject but the facts have been stated in connection with the life history of each species treated, and the relative prominence given to the matter in any case thus serves as a rough

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indication of the amount of good and harm to be charged to the account of each bird.

The great importance of wild birds to the agriculturist may be readily conceded. Nevertheless it seems very desirable, at this time, that we should recognize the fact that all the wild things of our country, birds, mammals, insects, plants, have a right to protection, preservation, recognition, entirely independent of their *economic* status, using that word to indicate merely the amount of good or harm in dollars and cents which can be attributed to them. The fox, the crow, the kingfisher, the muskrat, may or may not, in the long run, be "more beneficial than harmful," yet each in its own way has a scientific, an æsthetic, a human value, which cannot be estimated in dollars and cents and which should forever protect him from extreme persecution, and above all from final extinction.

Aside from the slips and errors which are inevitable in such a book, and for which the writer hopes but does not expect forgiveness, two points might seem to call for apology; first, the absence of colored plates, and second, the great length of some of the biographies. In explanation of the first defect it is perhaps sufficient to say that it is not the writer's fault, but merely a necessary economy. Such colored plates as can be obtained cheaply are lamentably poor, and the preparation of new and really good portraits, either from mounted specimens or from good paintings, involves an expense which at present is prohibitive.

The writer alone is responsible for the length of biographies, such as those of the Passenger Pigeon, the Crow, certain hawks, blackbirds, woodpeckers, thrushes, etc The main excuse lies in the economic importance of these species which seems to warrant somewhat extended discussion, especially in the case of those which directly affect the farmer and fruit grower. And this perhaps may be still further justified by the fact that for the past twenty-five years the writer has been a constant student of the complex relations of birds, insects and crops, and was for many years employed as a specialist in charge of such investigations under the U. S. Department of Agriculture.

Work was begun upon the present volume about ten years ago, but the constant pressure of college duties, increasing heavily from year to year, made it impossible to give much time to the matter during the academic year. Only those who have actually undertaken a similar task as a side issue of regular professional work can appreciate the labor involved, or understand the delays, disappointments and vexations experienced. The entire work was typewritten for publication in 1907, but owing to circumstances beyond the writer's control its printing was not authorized until the autumn of 1911. In the meantime it was largely rewritten, and brought up to date.

A comparison with Professor Cook's bulletin (second edition, 1893) will show that his list contained 336 species or subspecies as against 326 in the present work. This does not mean, however, that but ten species have been dropped from the list. The present state list lacks thirty birds included by Professor Cook, but contains twenty birds which that bulletin did not mention. The following lists enumerate the subtractions and additions respectively. The number in parentheses preceding each name is the serial number borne by that species in the list as published.

The species which were included in Cook's Birds of Michigan (1893), but are not retained in the present list are:

(1) Western Grebe
(6) Black-throated Loon
(8) Puffin
(9) Ancient Murrelet
(10) Black Guillemot
(11) Murre
(12) Razor-billed Auk
(21) Laughing Gull
(25) Gull-billed Tern
(31) Roseate Tern
(33) Sooty Tern
(35) Anhinga
(36) Common Cormorant
(60) Harlequin Duck
(68) Greater Snow Goose
(73) White-cheeked Goose
(74) Cackling Goose
(84) Louisiana Heron
(87) Yellow Crowned Night Heron
(89) Little Brown Crane
(112) Curlew Sandpiper
(132) Belted Piping Plover
(158) Gyrfalcon
(175) Carolina Paroquet
(182) American Three-toed Woodpecker
(229) Smith's Longspur
(244) Oregon Junco
(253) Varied Bunting; Nonpareil
(256) Summer Tanager
(292) Yellow-throated Warbler.

The reasons for excluding the above forms are given in detail in the Hypothetical List (Appendix 2), pages 736-757.

In addition it should be noted that the bird formerly listed as Traill's Flycatcher is now recognized as a distinct subspecies, the Alder Flycatcher; the smaller Michigan Shrike is considered a new subspecies, the Migrant Shrike; while the Northern Parula Warbler instead of the typical Parula Warbler, is the form found here.

The species in the present list of the birds of the state which were not included in Professor Cook's list of 1893 are:

(6) Brunnich's Murre
(9) Parasitic Jaeger
(26) Gannet
(29) Brown Pelican
(36) European Widgeon
(67) Wood Ibis
(70) Cory's Bittern
(74) Little Blue Heron
(83) Purple Gallinule
(123) Canada Ruffed Grouse
(165) Northern Hairy Woodpecker
(180) Say's Phœbe
(189) Hoyt's Horned Lark
(199) Thick-billed Redwing
(211) Greenland Redpoll
(212) Hoary Redpoll
(224) LeConte's Sparrow
(227) Harris' Sparrow
(288) Grinnell's Waterthrush
(314) Carolina Chickadee

The hypothetical list, forming Appendix 2 of the present volume, contains sixty-two additional species which at one time or another have been attributed to Michigan, but about which there is more or less doubt. Probably the larger part of them have never occurred in the state, and never will occur. Some of the others, however, doubtless will be found sooner or later, either as regular visitors in small numbers and to restricted areas, or possibly in larger numbers at long intervals. Almost any eastern American species may occur accidentally, and the same may be said of western forms which have a wide range in migration. Even European species may appear at long intervals, not simply such as have been imported purposely, and have escaped from captivity, but birds which nest in the far north of Europe or Asia, and have strayed to Greenland, Iceland or Alaska and been swept southward with the great tide of autumnal migrants. Interesting as such occurrences are to the student of geographical distribution, the small number of individual birds concerned gives the matter little or no economic importance.

In the preparation of the following pages published material has been drawn upon freely whenever it seemed advisable, but special effort has also been made to get new and unpublished information, and in all cases it has been the intention to give full credit for matter so obtained. At one time or another the writer has visited five of Upper Peninsula counties, and all but seven or eight of those in the Lower Peninsula, making personal notes of the birds observed in the field and searching out local collections and local authorities, in order to get every scrap of information obtainable. All the public museums of the state, most of the college museums, and scores of private collections have been visited and critically inspected, and it has been possible in this way to eliminate a number of "records" based on specimens which had been wrongly identified, and also to secure much additional evidence as to the distribution of rare or little known birds. Every possible assistance has been given by owners and custodians of such collections, and in some cases the records of years have been searched in order to furnish the information asked.

Only the hearty cooperation of the ornithologists and bird lovers of the state has made it possible to collect the material for the present volume, and I desire to acknowledge with sincere gratitude the unselfish help thus received from scientists, teachers, students and citizens generally throughout the commonwealth. A list of contributors will be found in Appendix 6, which probably includes most of those who have furnished lists, records, dates, specimens, pictures, cuts, notes, observations, addresses, etc., but in gathering notes through so many years it is inevitable, though most regrettable, that some names should be overlooked.

While it may seem unfair to discriminate among these generous contributors, it nevertheless is simple justice to mention a few to whom special recognition is due. One of the foremost of these was the late Dr. Morris Gibbs, of Kalamazoo, a valued friend and correspondent from 1894 until his death in 1908. Though physically debarred from field work for the last twenty years of his life, he was to the end a constant student of bird-life, always enthusiastic in everything which stimulated popular interest in his favorite science. Dr. Gibbs generously placed at my disposition all his early field records and manuscript notes, many of them of special value as relating largely to collections of birds and eggs obtained from him by the college before my connection with the institution, and forming part of the Agricultural College collection.

I am also deeply indebted to almost every former member of the Michigan Ornithological Club, among whom may be mentioned in particular Norman A. Wood, B. H. Swales, P. A. Taverner, L. Whitney Watkins, A. B. Covert, J. Claire Wood, Newell A. Eddy, E. E. Brewster, Percy Selous (deceased), Jerome Trombley, O. B. Warren, Dr. Robert H. Wolcott, Dr. W. H. Dunham, Dr. Leon J. Cole, Thomas L. Hankinson, and many others. To Mr. P. A. Taverner I am indebted not only for hundreds of field notes on Michigan birds, but for the original drawings or actual electrotypes from which thirteen of the full page plates and fifty-eight of the text figures have been made, the latter including almost all the detail drawings of heads, bills, wings, feet and tails used in the keys and elsewhere. The plates and figures of nests are mainly from the beautiful photographs made by Thos. L. Hankinson, while a student at the Agricultural College, years ago. My associate, Professor J. J. Myers of the Zoological Department, patiently photographed numberless museum specimens, from which nine plates and twenty-one text figures were selected, besides rendering efficient aid in many other ways. Other plates and figures were kindly furnished by the Division of Biological Survey of the U. S. Department of Agriculture, the National Committee of Audubon Societies, Bird Lore, and the owners, authors and publishers of several standard ornithological works, especially D. Appleton & Co., Dana Estes & Co., Little Brown & Co., Houghton, Mifflin & Co., and a few others, credit being given for each illustration as used. Special mention should be made of Plate I (Frontispiece), the Topography of a Bird, from Ridgway's Nomenclature of Colors (1886), by special permission of the author, and of Plate 70, the Hermit Thrush, presented by the artist, Mr. W. F. Jackson, of Mayfield, Michigan.

I am under special obligation to Dr. Robert Ridgway and Dr. C. W. Richmond of the U. S. National Museum, and to Dr. C. Hart Merriam, Dr. A. K. Fisher, Dr. T. S. Palmer, H. W. Henshaw, and other members of the Bureau of Biological Survey of the U. S. Department of Agriculture, for the examination of specimens, the verification of references, and many critical notes and suggestions. In addition, the Biological Survey kindly allowed the use of all its migration schedules from Michigan observers, together with the reports of lighthouse keepers at all Michigan lights.

The artificial keys, already alluded to, are mainly original, at least in their present form, but in constructing them use has been made of similar keys in various publications, particularly Ridgway's Manual, Coues' Key, and Chapman's Handbook. The technical descriptions also are original for the most part, having been written with specimens in hand, but of course after comparison with the best published descriptions available. In the case of a species not properly represented in our own collections the description given by Ridgway has usually been copied verbatim (between quotation marks), or, in a few instances the original describer has been quoted in the same way. The measurements given in the technical descriptions are usually from Ridgway's Manual of North American Birds (1887), and the same is true for the measurements of eggs. Dr. Ridgway's permission to do this is greatfully acknowledged.

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INTRODUCTION.

TOPOGRAPHY.

The State of Michigan, properly speaking, lies between 82½ and 90½ degrees west longitude and 41° 45′ and 47° 25′ north latitude. Isle Royal in Lake Superior, however, belonging to Keweenaw County, extends northward considerably beyond the 48th parallel. The state thus measures about 430 miles from north to south and 390 miles from east to west, and its area is about 57,480 square miles, of which the Lower Peninsula contains about 41,000 and the Upper Peninsula 16,000 miles. Geographically, Michigan is one of the most interesting states in the union for bird study, stretching from the southern prairies to the great evergreen forests of the north, and touching as it does all the Great Lakes except Ontario, with a coast line on these lakes exceeding sixteen hundred miles. It includes almost every variety of surface found in the eastern United States, with the exception of salt marshes and lofty mountains. The average elevation of the entire state is 840 feet above sea level, that of the Lower Peninsula 854 feet, slightly exceeding the average, its highest point being just south of Cadillac in Osceola County, where the land reaches 1,710 feet. Eighty-four per cent of the Lower Peninsula, however, is below one thousand feet and all but a small fraction of one per cent of the remainder is between one thousand and fifteen hundred feet, all of which lies north of 44 degrees. The highest point in the Upper Peninsula, Mt. Whitney in the so-called Porcupine Mountains of Ontonagon County, is 2,023 feet. When it is remembered that the surface of Lake Erie is 572 feet above sea level, Lake Michigan 581 feet, and Lake Superior 602 feet, it will be seen that most of the state is of very moderate relief.

As already stated, however, this surface is greatly diversified. There are hundreds of miles of sandy beaches and pebbly shores, often associated with some of the highest sand dunes in the world. Along the shore of Lake Superior picturesque sandstone cliffs rise hundreds of feet sheer from the ice-cold water. Great marshes are found here and there; thousands of lakes are scattered among the broad savannas of the south and the wooded wildernesses of the north, and a dozen goodly rivers and innumerable smaller streams gather the abundant rainfall and carry it sooner or later to the Great Lakes.

CLIMATE.

Many years ago Alexander Winchell wrote as follows of the climate of Michigan:

"The sinuosities of the several isothermal lines will demonstrate at a glance the peculiar character of the climate of Michigan and the fact that both in summer and winter, it is better adapted to the interests of agriculture and horticulture, and probably also to the comfort and health of its citizens, than the climate of any other northwestern state. The marked peculiarity of the climate of Michigan in these respects is attributable to the influence of the great lakes by which the state is nearly surrounded. It has long been known that considerable bodies of water exert a local influence in modifying climate and especially in averting frosts, but it has never been suspected that Lake Michigan, for instance, impresses upon the climatic character of a broad region an influence truly comparable with that exerted by the great ocean."

Some years later in an important article on the plant life of the state,* we find the following statement probably written by Erwin F. Smith:

"The climate of the Lower Peninsula is not as severe as that of the Upper, nor so even, but is subject to frequent, sudden, and extreme changes of temperature—as great a variation during the winter season as 53° Fahr. in less than 24 hours having been recorded. Such rapid changes more or less affect vegetation, especially the tender branches of cultivated trees, which are sometimes seriously injured. In one or two instances a like effect on our forest trees has been noticed. The annual range of temperature is about 116°, and the annual mean 46°. Of rainfall, including what falls in form of snow, we have, yearly, about thirty inches. Our snowfall is much less, for the same latitude, than that of New York and England. In the center of the peninsula, we seldom have more than a few inches at a time."

DISTRIBUTION OF PLANT LIFE.

The general distribution of plant life in the state thirty or forty years ago can hardly be better described than in the words of the authors already quoted, C. F. Wheeler and Erwin F. Smith.* It should be remembered that at that date the lumbering interests of Michigan had recently passed their maximum of development, but there were still immense areas of noble pine forests left.

"The proximity of the Great Lakes exerts a marked influence in equalizing the temperature, and the effects are marked upon our flora.

"Trees like Liriodendron Tulipifera (tulip tree), Asimina triloba (pawpaw), Cercis Canadensis (red-bud), Gleditschia triacanthos (honey locust), Cornus florida (flowering dogwood), Nyssa multiflora (sour gum), and Morus rubra (mulberry), which belong to Ohio and Central Illinois, have crept northward, favored by the mild influence of the lake winds, through the central and western part of the Lower Peninsula, often beyond the middle, and the same is true of smaller and less noticeable plants.

"As might be expected from the uniform surface of the peninsula, the flora is much alike throughout. Probably three-fourths of our species are common to all sections, though by no means equally distributed; some being very abundant in one district and rare in another at no great distance. In most cases such change is due to soil rather than to difference in elevation, temperature, or atmospheric moisture.

"The Lower Peninsula is covered with a deep drift of alternating sands, clays, and gravels, and the flora of any section depends chiefly on which of these happens to lie uppermost. With reference to its flora, the peninsula may roughly be divided into two great divisions—the hardwood and the softwood lands; one representing the Appalachian flora, and the other the Canadian.

"The hardwood country lies south of latitude 43°, and consists of very fertile sand, clay, or loam, mostly cleared of the original forest, and largely cultivated.

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* Wheeler and Smith, Michigan Flora, An. Rep. (Mich.) State Hort. Soc., 1880, pp. 428 et. seq.

"The sandy or stony drift of many river valleys in this section supports a heavy growth of oak, frequently interspersed with walnut and hickory, while the margins of the streams, and the neighboring swamps, abound in soft maples, swamp and chestnut oak, white and black ash, elm, hackberry, sycamore, butternut, and similar trees. Willows, dogwoods, viburnums, and buttonbush, are common shrubs in the swamps; and hazel, hawthorn, wild cherry and plum, June berry, witch-hazel, etc., are abundant on the dryer ground.

"On the uplands, and away from streams, clay, loam, and a peculiar black muck soil supersede the sands and gravels of the valleys. The prevailing timber here is beech and maple and oak forest in about equal proportions. Beech and maple generally grow together, forming magnificent forests of great extent. The best wheat farms are usually found on uplands, near streams, where the oak timber gradually shades into beech and maple. Plains of fertile sand covered with a low or scattering growth of oak (oak openings) are frequent, and always very desirable for farming purposes.

"Marshes densely covered with tamarack are common in this part of the state, and nourish in their thick shade such plants as Drosera rotundifolia, Sarracenia purpurea, Rhus venenata, Ribes rubrum, Chiogenes hispidula, Salix candida, Smilacina trifolia, Pogonia ophioglossoides and Calopogon pulchellus. Arbor-vitae, red cedar and black spruce are comparatively rare.

"A similar tract of soil and timber occurs in the upper end of the peninsula, north of a line drawn from Thunder Bay west to the head of Grand Traverse Bay. This is commonly known as the 'Traverse Region,' and has a flora much like that we have just described, with the exception that some of the southern species disappear, and northern ones begin to take their place, or if found growing further south, here first become frequent. Deep forests of hemlock and yellow birch (B. lutea) mixed with a fine, tall growth of striped maple (A. Pennsylvanicum) are frequent, having underneath a tangled growth of Taxus baccata, var. Canadensis, and under all a carpet of Lycopodium annotinum. Alternating with these are sandy plains covered with a dense growth of Vacciniums, yielding a great abundance of fruit. Sugar maples and basswood are also abundant in this region, and reach an immense size. In fact, it would be difficult to find finer groves of maple in any part of the state.

"The pine country proper lies between the two tracts we have described, and embraces about 15,000 square miles. It is composed largely of sand hills and plains, either scantily furnished with vegetation, or densely covered with pine forest. Argillaceous tracts wooded with beech and maple also occur, like oases in a desert; and swamps abound, with the usual lowland timber. Forests of hemlock spruce are frequent, and there are occasional ridges of oak. Birch (B. lutea) also begins to be a common forest tree, and attains a large size. The usual timber of the barrens is Jack Pine (P. Banksiana). Climatic and other influences have combined to produce groves composed entirely of this species of large size and of great beauty, for, instead of being 'a straggling shrub, or low tree' (Gray), it rises, often 50-60 feet, straight and symmetrical. All through this region Pinus strobus (white pine) is the prevailing species and furnishes most of the lumber, but P. resinosa (red pine) is frequent as far south as Clare county, and occurs sparingly in the northern part of Isabella county, which appears to be its southern limit.

"Such is the general character of the sylva down to about latitude 43°, but in the western part of the state, owing perhaps to moister climate, or to favorable soil, hemlock spruce is more abundant, and reaches much farther south, nearly or quite to the Indiana line, and the same is true of white pine.

"One seldom beholds a drearier sight than a dead and deserted lumber region. The valuable trees were all felled years ago, and the lumberman moved on to fresh spoils, leaving behind an inextricably confused mass of tree tops, broken logs, and uprooted trunks. Blackberry canes spring up everywhere, forming a tangled thicket, and a few scattering poplars, birches, and cherries serve for arboreal life, above which tower the dead pines, bleached in the weather and blackened by fire, destitute of limbs, and looking at a distance not unlike the masts of some great harbor. Thousands of such acres, repellant alike to botanist and settler, can be seen in any of our northern counties.

"In certain districts considerable beech is found associated with the pine. The soil of such tracts is usually of better quality, and can be rendered productive without much labor. It may be noted that in such cases the pine also grows thriftier and makes better lumber."

DISTRIBUTION OF ANIMAL LIFE.

According to Dr. C. Hart Merriam, our highest authority on geographical distribution of life in America, Michigan contains large areas of three of the main life zones of the eastern United States; namely, the Upper Austral or Carolinian Zone, the Transition or Alleghanian Zone, and the lower Boreal or Canadian Zone.

"The Carolinian faunal area occupies the larger part of the Middle States, except the mountains, covering southeastern South Dakota, * * * nearly the whole of Iowa, * * * Illinois, Indiana, Ohio * * * and large areas in New York, Michigan and Southern Ontario. On the Atlantic coast it reaches from near the mouth of Chesapeake Bay to southern Connecticut, and sends narrow arms up the valleys of the Connecticut and Hudson rivers. A little farther west another slender arm is sent northward, following the east shore of Lake Michigan nearly or quite to Grand Traverse Bay. These arms, like nearly all narrow northward prolongations of southern zones, do not carry the complete faunas and floras of the areas to which they belong, but lack certain species from the start and become more and more dilute to the northward till it is hard to say where they really end. Their northern boundaries, therefore, must be drawn arbitrarily or must be based on the presence or absence of particular species rather than the usual association of species.

"Counting from the north, the Carolinian area is that in which the sassafras, tulip tree, hackberry, sycamore, sweet gum, rose magnolia, red bud, persimmon, and short-leaf pine first make their appearance, together with the opossum, gray fox, fox squirrel, cardinal bird, Carolina wren, tufted tit, gnatcatcher, summer tanager, and yellow-breasted chat. Chestnuts, hickory nuts, hazelnuts, and walnuts grow wild in abundance. The area is of very great agricultural importance." (Merriam. Life Zones and Crop Zones of the U. S., Biol. Survey, Bull. 10, 1898, pp. 30-31.)

According to the same author "The Canadian zone comprises the southern part of the great transcontinental coniferous forest of Canada, the northern parts of Maine, New Hampshire, and Michigan * * * and the greater part of the high mountains of the United States and Mexico * * * Among the many characteristic mammals and birds of the Canadian zone are the lynx, marten, porcupine, northern red and pine squirrels, varying and snowshoe rabbits, star-nose, Brewer's and Gibbs' moles, water shrew, voles and long-tailed shrews of various species, northern jumping mice * * * white-throated sparrow, Blackburnian and yellow-rumped warblers, olive-backed thrush, three-toed woodpeckers, spruce grouse, crossbills, and Canada jays. Counting from the north this zone is the first of any agricultural importance. Wild berries—as currants, huckleberries, blackberries and cranberries—grow in profusion, and the beechnut (in the east) is an important food of the native birds and mammals. (Ibid. pp. 19-20.)

"The Transition zone is the transcontinental belt in which Boreal and Austral elements overlap * * The zone as a whole is characterized by comparatively few distinctive animals and plants, but rather by the occurrence together of southern species which here find their northern limit and northern species which here find their southern limit. It may be sub-divided into three faunal areas * * * The eastern humid or Alleghanian area comprises the greater part of New England, southeastern Ontario, New York, Pennsylvania, Michigan, Wisconsin, Minnesota, eastern North Dakota, northeastern South Dakota, and the Alleghanies from Pennsylvania to Georgia. * * * In the Alleghanian faunal area the chestnut, walnut, oaks and hickories of the South meet and overlap the beech, birch, hemlock and sugar maple of the North; the Southern mole and cotton-tail rabbit meet the Northern star-nosed and Brewer's moles and varying hare, and the Southern bobwhite, Baltimore oriole, bluebird, catbird, chewink, thrasher and wood thrush live in or near the haunts of the bobolink, solitary vireo, and the hermit and Wilson's thrushes. Several native nuts, of which the beechnut, butternut, chestnut, hazelnut, hickory nut and walnut are most important, grow wild in this belt. Of these the chestnut, hickory nut and walnut come in from the South (Carolinian area) and do not extend much beyond the southern or warmer parts of the Alleghanian area." (Ibid. pp. 20-21).

Dr. Merriam's map accompanying the paper just cited assigns the entire Upper Peninsula of Michigan to the Canadian zone, together with all that part of the Lower Peninsula lying north and east of a line drawn from Traverse City on Great Traverse Bay to Point Au Gres at the mouth of Saginaw Bay on Lake Huron. The Carolinian zone includes the two southernmost tiers of counties in the Lower Peninsula and all those counties bordering Lake Michigan on the east as far north as Great Traverse Bay (20 counties in all). The remainder of the Lower Peninsula, covering about 30 counties, is assigned to the Transition zone. This arrangement gives about two-fifths of the state to the Canadian, two-fifths to the Transition or Alleghanian, and one-fifth to the Carolinian, an apportionment to which we cannot entirely agree. In our opinion little or no error would be made if the entire state, Upper Peninsula as well as Lower, were assigned to the Transition. With the possible exception of Isle Royal and Keweenaw Point no part of the state sustains a purely Boreal (or Canadian) fauna or flora, and it seems equally certain from the data at hand that even the southernmost counties are not purely Carolinian.

Of course since the Transition is characterized by the mingling of the forms belonging to the two zones lying on either side, it becomes necessary to draw two dividing lines instead of one. Near the southern boundary of the Transition Carolinian forms should predominate, while near the northern boundary Canadian forms should prevail. At first sight it would seem perfectly simple to formulate a rule by which the boundaries of the Transition might be surely defined. Moving southward in the Canadian zone that spot in which the first Carolinian species is encountered would give one point in the boundary between Canadian and Transition. Other points similarly determined would give, when connected, the actual boundary line. In the same way theoretically the boundary between Carolinian and Transition could be determined. Practically, however, the matter is far from simple. It is not easy to decide exactly what species really belong to the Canadian or the Carolinian and hence can be used as test species. Birds are less useful than mammals or plants for this purpose, since they move so freely and rapidly and are so likely to wander or to be carried accidentally far outside their proper habitat. And it often happens that a species which in one part of the country, say the East, may be perfectly characteristic of a certain faunal area will be a very unsafe index a few hundred miles farther west.

Take for example the species which Dr. Merriam names as characteristic of the Carolinian. Among these the sassafras, the fox squirrel and the gnatcatcher are found throughout the greater part of the Lower Peninsula, while the summer tanager does not occur at all—not even in the southernmost counties. On the other hand the porcupine and varying hare, both Canadian forms, were found, until very recently at least, in practically every county in the state, not infrequently side by side with the opossum and the Cardinal. The Carolina Wren, Mockingbird, Yellow-breasted Chat and Tufted Tit occur sparingly, perhaps accidentally, over a wide area in the Lower Peninsula, but seem to be nowhere common.

In the present state of our knowledge, or rather of our ignorance, we hesitate to accept Merriam's faunal map, yet are not prepared to offer a substitute. The indications, however, all point toward a decided lessening of the Michigan areas assigned by him to the Canadian and Carolinian, with a corresponding increase in the size of the Alleghanian or Transition.

BIRD LIFE IN MICHIGAN.

In view of the facts just set forth it seems hardly wise to attempt an enumeration of the bird species found in each of the faunal areas represented in the state. Instead it may be worth while to take a rapid survey of some of the different regions of the state with brief lists of the commoner or more characteristic species found in each. It must be distinctly understood that the mere naming of a species as an inhabitant of any one region does not by any means imply that it may not occur elsewhere frequently or regularly.

It should be noted also that when species are named as common residents of any region it is meant as a rule that they are found there during the nesting season, that it is in a sense their home. In this connection reference should be made to a later page in which the subject of migration is briefly discussed.

In taking up the matter of bird distribution in Michigan, it will be convenient to consider the bird life of five different regions, namely:

1. The Prairie Region of the South.
2. The Great Marsh Regions of the southeastern border.
3. The Pine Forest Region.
4. The Plains Region, or "Jack Pine Plains."
5. The Hardwood Forest Region.

The Prairie Region of southern Michigan is really little more than an extension northward of the prairies of the adjoining states of Indiana and Illinois. Probably it was always devoid of pine forests, at least that has been its condition for the last few centuries, and it is now but lightly forested at best, and with many large stretches of nearly level land. Characteristic birds of the open country are the Prairie Chicken, Meadowlark, Killdeer, Mourning Dove, Marsh Hawk, Turkey Buzzard, Prairie Horned Lark, Lark Sparrow, Bobolink, and formerly the Bartramian Sandpiper or Upland Plover. Along the tree-fringed streams are found the Bronzed Grackle and Red-winged Blackbird, Red-headed Woodpecker and Flicker, and less often the Red-bellied Woodpecker, Orchard Oriole, and Prothonotary and Sycamore Warblers. The knolls and ridges here and there harbor the Quail or Bobwhite, the Tufted Tit, Blue-gray Gnatcatcher, and an occasional Chat, Cardinal, Mockingbird and Carolina Wren.

The Great Marsh Region consists really of at least three separate regions, viz.: The extensive marshes bordering the lower Detroit River and western end of Lake Erie, the delta of the St. Clair River in Lake St. Clair, and the great marshes along the southeast shore of Saginaw Bay. Of course there are other marshes, and some large ones, for example at the mouths of the Kalamazoo and Muskegon rivers, but most of them are small compared with those first named. Characteristic birds of the great marshes during the nesting season are the Pied-billed Grebe, Mallard Duck, Blue-winged Teal, Coot, Gallinule, Bittern, Least Bittern, Great Blue Heron, Green Heron, Black Tern, King Rail, Marsh Hawk, Long-billed Marsh Wren and Red-winged Blackbird. During migration waterfowl in great variety visit these marshes to feed and rest, and here are located some of the most famous ducking grounds in the middle west.

The Pine Forest Region proper is characterized by the presence in variable quantity of the white pine and the red or Norway pine, and is mainly sandy land lying north of the 43d parallel, though the original southern limit of the merchantable white pine was an irregular curved line, beginning in the southwest corner of the state in Van Buren county, extending northeastward to the northern part of Gratiot county, and thence east through Saginaw, Genesee, Lapeer and St. Clair counties to Port Huron. Throughout the region north of this line the white pines and the red pines were always distributed irregularly, the largest white pines scattered among the hardwoods, and the unmixed tracts of this magnificent tree found on the sandy uplands drained by the great streams, the Saginaw, Muskegon, Manistee, Au Sable and Thunder Bay rivers.

The region just outlined as the Pine Region scarcely merits that name at present, since merchantable pine has been almost completely removed. The precise area of standing pine timber left in the state today is difficult to estimate, since cutting is going on constantly and the small amounts left are being reduced every day. It is doubtless safe to say that very few tracts exceeding eighty acres are still left in this entire area, and even eighty-acre tracts are decidedly infrequent. Owing to the fact that much other timber was intermixed with the pine in most places and that some of the hardwood timber has not yet been touched, part of the region included under the above title might now be properly transferred to some other, while the greater part of the former pine region, at least in the Lower Peninsula, would at present come under the head of "Cut-over Lands," and much of this in turn unfortunately is also "Burnt-over Land." Throughout the entire Pine Region there were great stretches of hardwood forest here and there and more frequently swamps largely made up of the white cedar or arbor vitae, tamarack, hemlock, balsam fir, and spruce. Hemlocks also occurred regularly among the pines and hardwoods scattered more or less thickly and often reaching gigantic size. Where these hemlocks stood among the hardwoods and there was little underbrush they have commonly been killed by the ground fires which have licked up the leaves and other rubbish, leaving the large hardwoods uninjured but burning the resinous butts of the hemlocks deeply enough to destroy them. Owing to the admixture of these species, and especially to the fact that much of the white pine region as interrupted and interlaced with tracts of Jack pine, to be mentioned later, it seems best to limit the term Pine Region to those parts which originally were forested mainly with the white pine or with this and the Norway pine. What may have been the original bird life of these great pine forests is somewhat uncertain. Study of the few large tracts left gives us some hints, but the variations in elevation, geographical position, and local conditions make the generalizations based on these instances somewhat unsafe. It is matter of common knowledge that the deep forest never holds the abundant bird life that is found along its edges or in the more lightly timbered openings. All life seems to be more or less repressed and smothered so that reptiles, mammals, and even insects, as well as birds, seem to have suffered somewhat the same effect as the shrubby and herbaceous vegetation which dwindles or dies out almost entirely in the deep shade of the pine.

Characteristic birds of the real pine forest are comparatively few. Among them may be mentioned the woodpeckers, particularly the Pileated, Hairy and Three-toed, the two species of Nuthatch, the Black-capped Chickadee, Brown Creeper and Winter Wren, the Crow, Blue Jay and Canada Jay, the Wood Pewee and Olive-sided Flycatcher, the Red-shouldered and Sharp-shinned Hawks, the Great Horned, Long-eared, Barred, and Screech Owls, the Red Crossbill and Pine Finch, the Hermit Thrush and in some places the Olive-back, and several species of Warbler, the most constant being the Pine, the Black-throated Green, the Blackburnian and the Black and White.

The Jack Pine Plains, or the Plains Region, forms a vast, irregular area lying mainly within the pine region just described but consisting of those sandy and rather sterile plains which lie farther from the water courses and are characterized by the abundance of the almost worthless Jack Pine (Pinus banksiana), several oaks collectively known as scrub oaks, certain poplars or aspens, the low willow (Salix humilis), the pin cherry, chokecherry and service berry or shadbush (Amelanchier). The sweet-fern (Comptonia), wintergreen (Gaultheria), various blueberries (Vaccinium), and the eagle fern (Pteridium aquilinum) are equally characteristic among the undergrowth, and in favorable places the ground may be matted with the Bear Berry (Arctostaphylos) or overgrown with trailing arbutus (Epigaea repens). Twenty-one counties in this region aggregate more than two million acres of the plains lands, Oscoda county in the northeast alone holding 204,000 acres, and Newaygo county at the southwest 194,000 acres.

The summer bird population of these plains is as characteristic as their plant life, and includes not less than fifty species, those most frequently met with, roughly in order of abundance, being: Vesper Sparrow, Chipping Sparrow, Field Sparrow, Robin, Bluebird, Chewink, Nighthawk, House Wren, Kingbird, Cedarbird, Wood Pewee, Flicker, Brown Thrasher, Catbird, Chickadee, Bluejay, Red-eyed Vireo, Junco, Indigo Bird, Sparrow Hawk, White-breasted Nuthatch, Hairy Woodpecker, Black-billed Cuckoo, Goldfinch, Cowbird and Hermit Thrush.

Particular interest is given to the region by the fact that Kirtland's Warbler, the rarest of North American warblers, has been found nesting on the Jack Pine plains of two counties, Oscoda and Crawford, and nowhere else in the world, though it is a foregone conclusion that it will be found eventually in neighboring counties, if not in similar regions in the Upper Peninsula and in Wisconsin.

The borders of the rivers and smaller streams which dissect the plains furnish other common species, such as the Kingfisher, Bank Swallow, Great Blue Heron, Rose-breasted Grosbeak, Crested Flycatcher, Song Sparrow and Phoebe, while the included or adjacent swamps of arbor vitae (white cedar), balsam-fir, spruce, hemlock and white pine harbor scores of other birds, the most abundant and universal being half a dozen kinds of hawks and owls, three or four species of woodpeckers, including the Black-backed Three-toed, a dozen species of warblers (Canadian, Magnolia, Black and White, Parula, Yellow-rumped, Blackburnian, Yellow, Maryland Yellow-throat, Nashville, Mourning, Small-billed Waterthrush, Black-throated Green), several flycatchers and thrushes, the Winter Wren, and commonest of all, the White-throated Sparrow. It is a singular fact that the Jack Pine Plains proper have no single species of warbler which is at all characteristic, with the exception of the rare Kirtland, of whose distribution as yet we know so little. True, in certain spots, where conditions are especially favorable, where the Jack Pines themselves form goodly groves of medium height, or where oaks and maples indicate better soil or more moisture, we find the Oven-bird, the Black-throated Green Warbler and the Black and White, while an occasional Chestnut-sided, Yellow, or Redstart may be found almost anywhere; as a rule, however, the typical Jack Pine Plains are marked by the complete absence of warblers.

The Hardwood Forest Region in the upper half of the Lower Peninsula still includes hundreds of thousands of acres of hardwood lands, on which there is a heavy growth of noble beech and maple, intermixed with birch, basswood and other broad-leaved trees, and formerly with scattered white pines and hemlocks of large size, now mostly cut by the lumberman. These woods, for the most part, are on high or at least fairly well-drained land, not to be mistaken for the swamp lands with their much inferior covering of elm, ash, birch, cottonwood, tamarack, red maple and other softwood trees. These grand hardwood forests are the summer homes of many birds not seen elsewhere, though of course they shelter also species of general distribution.

Among the more characteristic forms may be mentioned, again in approximate order of abundance: Hairy and Downy Woodpeckers, White-breasted Nuthatch, Chickadee, Wood Pewee, Hermit and Wood Thrushes, Red-eyed and Solitary Vireos, Sapsucker, Crow, Rose-breasted Grosbeak, Scarlet Tanager, Ovenbird, Blackburnian, Black-throated Blue and Black and White Warblers, Redstart, Red-shouldered, Broad-winged and Cooper's Hawks, Winter Wren, and Pileated Woodpecker.

Burnt-over lands, of which there are millions of acres in the state, vary much in their bird-life according to the nature of the original forest, whether largely pine or hardwood, and especially the length of time which has elapsed since the burning. The most desolate are the pine regions originally lumbered and then burned, where the sandy soil has had most of the humus eaten out by the fire and there is not enough body left to sustain a good second growth. Such an area comes to be lightly covered with blueberry and blackberry bushes, aspen or poplar, and one or more species of small willow, while the visible remnants of the primeval forest, soon disappear. One may ride for hours through these desolate solitudes and see hardly more than a dozen species of birds, the commonest being the Vesper Sparrow, Field Sparrow, Chewink, Nighthawk, Kingbird and Cowbird. If the fire-swept district had not been previously lumbered, or the fire had spread slowly, killing but not consuming, the myriads of bleached or blackened trunks attract numerous woodpeckers and their holes later furnish congenial homes for Bluebirds, Tree Swallows, House Wrens and Sparrow Hawks. Where the original timber was largely hardwood, indicating good soil, a thrifty second growth follows axe or fire and unless repeatedly fire-swept a new tangle of broad-leaved shrubs and trees is rapidly built up, where we find an abundant bird-life in which the Junco, Song Sparrow, Chipping Sparrow, Indigo Bird, Goldfinch, Catbird, Brown Thrasher, Yellow and Chestnut-sided, Maryland Yellowthroat and Mourning Warblers are added to the forms already mentioned.

The deep woods, whether swamp or upland, never shelter the wealth of bird life found in partly cleared or well cultivated districts. Stream-borders, lake margins, or other openings in the forest always teem with bird and insect life, for here a greater variety of conditions is found and larger numbers of birds seek the sunlight and shade, food supply and shelter which insure, so far as wild nature can, the welfare of their young.

RECENT CHANGES IN THE BIRD LIFE OF THE STATE.

There is a general and probably a correct impression that birds as a whole are much less abundant in the eastern United States today than they were a half century ago, and this doubtless is as true in Michigan as elsewhere. It is further believed that such changes in Michigan have been specially marked because of the removal of so much timber in recent years. Unquestionably the deforesting of the northern parts of the Lower Peninsula has made noteworthy changes in the birds of the region and such changes are still in progress and doubtless will continue, since the axe is commonly followed by fire, and that again by more or less complete reforestation or by the cultivated fields of the farmer and fruit grower. Moreover the draining of many of our extensive swamps and marshes has altered in a marked degree the character of large portions of the state and has changed correspondingly the conditions under which the birds of these regions live. For example, when a dense pine forest is completely removed certain species formerly abundant in the woods disappear completely, some remain for a time, although in diminished numbers, and others seem to be but slightly affected or may even increase noticeably. At the same time a considerable number of new forms appear, species partial to open fields or bushy plains and never found in the dense forest.

In attempting to recognize and explain the changes in bird population which have taken place during the last century, we are met at the outset by the lack of accurate knowledge as to the conditions at the beginning of that period. We know with more or less certainty what species could be found here and there in the wilderness, or about the cultivated areas of the pioneers; but even at the present day careful estimates of the number of individuals of any one species inhabiting a given area are not common and formerly such a census was rarely if ever attempted. Even at the present time the casual observer, or even the local observer whose experience has been limited to a small field, is certain to be deceived by appearances and is apt to believe that the yearly fluctuations in the number of birds observed indicate great increase or decrease in the total numbers in the entire country. No mistake is more common among people who are bird lovers but not bird students than the belief that some particular spot with which they are familiar is particularly rich in bird life, while some adjoining and similar region is almost devoid of it. Usually a little inquiry shows that the first region has been visited during the period of migration either in spring or fall, while the other has been seen only during midsummer or in winter. Any careful observer who has lived for years in a region outside the great bird highways must have noted the almost complete absence of certain species one year and their reappearance subsequently in normal or even in extraordinary numbers. We have not time here to discuss the causes of such variations, but we are doubtless safe in saying that each has a simple and satisfactory explanation, although this may not be the same in every case. The important thing for us to note is that the facts on which estimates of bird population can be based are few and unsatisfactory and we are very likely to be misled and to reach conclusions which prove eventually far from the truth. In seeking to obtain an approximation to the truth in regard to increase or decrease dependence has been placed largely upon the writer's personal experiences, in Michigan and elsewhere, but all sources of information which seem trustworthy and pertinent have been freely utilized.

In certain cases there can be no question as to a great decrease in numbers in recent years. For example, the Passenger Pigeon and the Wild Turkey have become absolutely extinct, while the Sandhill Crane and the Northern Raven have dwindled from abundant species almost to the verge of extinction. On the other hand, it would seem, from recent records, that the Barn Owl, the Cardinal, Henslow's Sparrow, Baird's Sandpiper, and a few other species had increased decidedly in the last few decades. In the case of rare species, however, a very large element of error is likely to creep in. We must not forget that in such cases the number of birds taken or recorded will be directly proportional to the number of good observers in the field; and there can be no question that the number of such observers has increased very largely in recent years. Hence we may fairly suppose that if a somewhat rare species —rare enough to be worthy of record whenever seen—were to remain practically stationary as to abundance, it would nevertheless be reported much more frequently now than formerly, and unless on our guard we should be misled as to its actual numbers. On the other hand it seems highly probable that the Robin, for example, has largely increased in Michigan as the forests have been removed, the marshes drained, and cultivated fields, meadow land, pasture, and orchard have taken their place. This bird, however, being fairly common everywhere receives little attention in the bird journals, and the matter of its abundance is seldom discussed, unless as happens occasionally, it becomes a decided nuisance to the fruit grower.

An instance of a different character is seen in the Red-winged Blackbird. The draining of immense areas has materially reduced the breeding grounds of this species, while at the same time the great increase in the cultivated areas surrounding the nesting places which are left has tended to distribute the harm done so that complaints of damage are now of comparatively infrequent occurrence. It seems reasonably safe to say that there has been a noticeable decrease in the numbers of this species, yet undoubtedly there are regions in which the harm done is as great now as at any previous time.

In addition to the Passenger Pigeon and Wild Turkey, already exterminated, there are at least eight other species which have decreased so noticeably during the last few decades as to be now on the verge of extinction at least in Michigan. These are the Greater Egret, the Sandhill Crane, the Knot, the Bartramian Sandpiper or Upland Plover, the Hudsonian Curlew, the Prairie Chicken, the Pileated Woodpecker and the Northern Raven.

A few years ago we might have included in this list the Wood Duck and the Woodcock, both of which had become very scarce and were believed to be in imminent danger of extinction; fortunately, however, these two birds seem to be no longer decreasing, and there is reason to hope that they may again become fairly common.

Of course there are scores of other species which have decreased greatly, and some of them may be exterminated eventually before those just named. Almost every so-called game bird and water fowl is far less abundant than formerly, and nothing but a general recognition of the danger and wise legislation coupled with hearty and universal support can prevent their final extinction in the not distant future. The eight birds just named, however, at present seem to be those in greatest danger. The supposed causes of their decrease are discussed at length in connection with the life history of each species, so that we need not go into details here. It may be well to note, however, that five separate, yet more or less connected factors, have been operative in affecting the numbers of our birds; namely, the gun, the axe, fire, the drain, the plow. Of these by far the most important agent for decrease has been the gun, and its influence is steadily increasing. Axe, fire and plow form a trio of destructive and reconstructive agents which perhaps are now near the maximum of their combined power, though the sound of the axe has been growing steadily fainter for twenty years past. The drain and the plow are still powerfully affecting our bird fauna, unquestionably lessening the number of species, but just as surely increasing the total bird population through the increased food supply and better protection during the nesting season.

With the exception of the Pileated Woodpecker, whose decrease depends directly on the removal of the forest, probably no one of the eight species now in danger has reached its present condition through the action of any single factor among those named. The Greater Egret, never common, has decreased steadily with other members of its family as the swamps have been drained and the use of the gun become more common. The Sandhill Crane has been a favorite mark for the rifle, its flesh forms palatable food, and its nesting grounds have been lessened through drainage. The disappearance of the Knot and Curlew is not fully explained, but is partly, though not entirely, due to the gun; neither species, however, nests within our limits and doubtless some factor operative on the nesting ground is largely responsible for the decrease. The Upland Plover has been rigorously followed as a game bird, but the cultivation of the prairies and pastures in which it loves to nest is partly responsible for its steadily failing numbers. Much the same causes have aided the disappearance of the Prairie Chicken, although the drain, the plow and fire have all been operative. The case of the Raven is unique. It certainly retires before advancing civilization, but precisely for what reason we are unable to say. The territory which seems to become untenable for the Raven is at once fully and safely occupied by the Crow, a near relative and of similar habits. Of late years, especially in the Upper Peninsula, the remaining Ravens have been largely killed by poison intended primarily for wolves.

HOW TO STUDY BIRDS.

The study of birds, like any other study, has two main objects, first, to acquire additional knowledge of facts; second, to increase the power of gaining knowledge. The lover of birds wishes to increase his knowledge of them, desires to know more birds at sight and to learn more facts with regard to those already known. This simple aim may be partly realized through the simplest sort of study, commonly known as nature study, in which the student, most often but not necessarily a child, learns to look for and find and study certain natural objects which have been previously pointed out to him, or better still described to him in such a way that with due diligence he may find and recognize them. No branch of science offers greater possibilities for nature study than ornithology, yet as ordinarily taught and studied this kind of nature study is not a science and never can become one. The great danger lies in the frequent mistakes which beginners in bird study are sure to make and the fact that these mistakes often go uncorrected through lack of knowledge on the part of guide or teacher.

The scientific ornithologist on the other hand must deal with facts about which there is a minimum of doubt. Conclusions based upon the observations of inexperienced people are always open to serious question. The scientific bird student must first of all handle actual birds; since, unfortunate as it may seem to many nature lovers, accurate, absolute and full knowledge of birds can be obtained only by studying them alive, by killing and preparing them for preservation, and by studying and comparing specimens so preserved. As Dr. Elliot Coues, one of America's foremost scientists, truly said forty years ago, "Life, even bird life, is too sacred a thing to be needlessly or thoughtlessly sacrificed." Yet countless facts of the utmost importance in the scientific study of birds can be obtained only through the sacrifice of bird life, and an ornithologist who aspires to be an authority upon his science must ruthlessly suppress his natural feelings in this respect and must procure and make use of such material as is absolutely necessary without regard to what are often described as the humane sentiments. This does not mean that any untrained boy has the right to take his gun into the field and kill birds indiscriminately or even freely under the impression that his intention to preserve some as specimens and to study such specimens later justify the action. On the contrary the right to collect birds freely for scientific purposes should be carefully restricted to such persons as can give evidence of a serious purpose to use to advantage the specimens so taken. The Michigan law covering this point is clear and strong.

A moment's thought will convince any one that the student who searches the woods carefully for a bird which he has never seen, who follows up each unknown call or song, watches with care each doubtful and illusive form which suggests the bird desired, and finally, perhaps after hundreds of disappointments, kills a specimen of the much coveted species and measures, preserves and labels it for his own collection, has gained a knowledge of the appearance, habits, notes, size and structure of this species which could be obtained in no other possible way. Not only has he gained all this knowledge with regard to this particular specimen, but in doing so he has exercised, consciously or unconsciously, his powers of observation, comparison and discrimination with regard to scores of other birds, so that his experience has been broadened and his power and judgment very materially strengthened.

It may seem to some that essentially the same result could be obtained if our student were accompanied to the woods by an instructor who should call his attention to the note of the bird sought, point it out and comment on its peculiarities and after watching the specimen carefully, perhaps through a field glass, record his observations and allow the bird to depart unharmed. Such a method of study unquestionably has its advantages, especially for the bird, but except in the case of a limited number of species, a certain degree of doubt must inevitably attach to such a method of identification, and perhaps the most unfortunate result of this method of teaching lies in the belief which gradually grows up in the pupil's mind that he can identify birds just as well by eye and ear as the professional with his gun.

At the present time current literature abounds in more or less accurate and beautiful description of birds and bird life, and much of this material has not only high literary merit but considerable scientific value. Nevertheless the trained ornithologist rarely reads such an article without detecting here and there evidences of ignorance or at least inaccuracy, which though not always glaring are nevertheless much to be regretted. It is perfectly true that an average keen-eyed boy or girl can readily learn to know most of the commoner kinds of birds in his vicinity without the use of the gun, provided he have the instruction of a competent teacher and in addition have access to a suitable collection of specimens.

But it is equally certain that no boy so taught, or for that matter any older person, can ever learn to know *all* the birds of his vicinity or even all the plumages of the common species, male and female, old and young, spring and autumn, through any such method of teaching.

Hence careful ornithologists throughout the country have been led more and more to lay down the rule that the "record" of any species for a given locality should rest upon an actual specimen taken in that locality and either preserved for the examination of any one interested or at least examined and identified by a competent authority before being destroyed. Our state lists, as well as out local lists, contain too many records of rare birds which do not come up to these requirements. True, there are cases in which the most fleeting glimpse of a bird is sufficient for its identification by a good observer, yet the best of us make mistakes, just as the best marksman has his "off days," and it is a good rule not to accept as a true record the mere observation of even the best ornithologist, unsupported by a specimen, unless at least there is no improbability in the occurrence of the bird at such a time and place.

In the following pages will be found many descriptions of size, plumage, notes and habits, which it is hoped will help observers to recognize and identify to their own satisfaction many species of birds with which at present they are unfamiliar. It is to be hoped that identification secured in this way will lead to further study and closer attention, so that gradually a love of such knowledge may grow up in the observer and contribute throughout his existence to the joy of life in the open and a fuller knowledge of the glories of nature which surround him. Yet it should be distinctly understood that the technical descriptions in this work, and especially the artificial keys for the determination of birds, are intended mainly, if not entirely, for use *with specimens in hand.* A "guess" as to the length of a bird or any of its parts, an "impression" as to the size, location, and intensity of color markings may sometimes serve the same purpose as a careful examintion of a specimen in hand, but this is by no means the rule and especially with beginners is almost unsupposable. It is possible doubtless to make a field key by means of which a good observer (meaning a person with good eyes, good sense, and some field experience) may identify a considerable number of birds at gun-shot range, or even at a greater distance, but no attempt has been made in this book to prepare such field keys, the writer's experience with a large number of students, old and young, during the past twenty-five years having convinced him that such keys, without considerable preliminary training, have very little value.

Scattered through the following pages will be found numerous so-called keys for the separation of suborders, families, and species, and a little examination of these will show that the plan upon which they are constructed is based upon the presence or absence of certain characters or sets of characters, so that the student with specimen in hand simply needs to determine first which one of two statements fits the specimen in hand, his decision in this case leading to the comparison of two other statements, and so, step by step, he is led to recognize in his specimen the existence of certain definite peculiarities and eventually reaches a conclusion applicable only to a single order, family or species, as the case may be, and that the one represented by the bird in hand. Having thus located the order, suborder or family to which his specimen belongs he turns to the section describing the members of that group and there finds another key which in the same way will lead to a smaller group and this in turn to the species. Probably the beginner will be struck at once by the fact that some characters which he has supposed quite important are rarely selected, while others which may seem trivial are very largely used. Thus, for example, color or color pattern is used much less frequently than size or the proportions of various parts. This naturally leads to a discussion of the facts which make it possible to arrange these artificial keys.

At the outset it should be made clear that all the individual birds belonging to the same species are essentially alike in size, proportions and color, after suitable allowance has been made for sex, age and season. A bird is said to be adult when it is old enough to breed, and in most cases this point is reached after a single year's growth. But such a breeding bird is not necessarily mature in the scientific sense, as shown by the fact that its plumage may change repeatedly and for several years before its color pattern and the colors themselves become permanent. This is seen clearly in the Bald Eagle, which does not get the pure white head and tail until at least three years of age, sometimes doubtless not before the fourth year, though yearling birds are believed to nest as a rule. Essentially the same thing is true of many other birds of prey, as well as of many water birds. These cases nevertheless are exceptional and most of our smaller birds become practically mature in a single year, though it seems certain that they may improve somewhat in appearance for several successive years. This is noticeable in such birds as tanagers, grosbeaks, bluebirds, and others in which the males are brightly colored. There is much variation in the perfection and brilliancy of plumage among these males, some retaining considerable areas of the dress characteristic of immaturity, while others, apparently the most robust and vigorous, exhibit the characteristic plumage in the highest degree of perfection. Possibly, or even probably, these variations are not entirely due to difference in age, yet it seems fairly certain that this is the most universal factor. As regards size, however, there is little or no change after the first year (except in a very few cases), and as a rule young birds old enough to fly and care for themselves are as large as their parents. For example, young robins or bluejays two weeks after leaving the nest have practically the same measurements (however, not the same weight) as their parents. Every observant person, however, knows perfectly well that the young robin of this age is still heavily spotted on breast and back, in this respect entirely unlike its parents, while the young bluejay of the same age resembles its parents much more closely, the differences lying not so much in color or pattern, as in the lax and fluffy texture of the plumage, the decidedly shorter crest, and a certain dullness and lack of brilliance about the colors themselves.

The matter of size cannot be too strongly insisted upon. In the common mind the small hawk or duck or swallow is merely a young individual of the same kind as the larger ones about it, yet in nine cases out of ten this assumption is entirely wrong. Sportsmen talk constantly and confidently of very large woodcock or partridges or ducks, their idea of size being based upon weight. It is perfectly true that a woodcock or duck when fat and in what is called good condition will weigh from one-third to one-half more than the same bird when thin. Yet the measurements of total length, expanse of wings, single wing, and tail will remain absolutely the same whether the bird be thin or fat. Of course there is often a wide difference in size, as well as in weight, between the male and female of the same species, and certain birds, for example grouse and ducks attain their full size much more slowly than the average small bird, such as the sparrow or thrush. In the case of the latter birds the ability to fly is acquired only when almost full grown, and as stated before they become as large as their parents within two weeks after leaving the nest.

A certain amount of variation nevertheless does exist among birds even when those of the same age and sex are considered. This is known as "individual variation" and is usually confined within narrow and pretty definite limits. As a rule such variation does not exceed ten per cent of the average. Thus if the average length of a bird is six inches the extremes would be from about 5.7 to 6.3, and the same rule would apply to measurements of wings, tail, beak and feet. The total length of a bird can be obtained accurately only from the bird itself before it has been skinned, or as we say "in the flesh." It is taken by laying the bird upon its back upon a table, taking the beak in one hand and the feet in the other and stretching the specimen hard enough to take all the curves out of the neck and back. While in this position the distance between tip of bill and tip of tail gives the measurement known as total length. Another measurement often taken from the fresh specimen is known as "extent of wings" or spread of wings. This is found by first thoroughly relaxing both wings by opening and closing the joints, and especially the shoulder joint, after which the bird is placed upon its back and with one hand holding each wing by the carpal or wrist joint the wings are spread as far as possible and at right angles to the body. While in this position the distance from wing tip to wing tip is called extent of wings or spread of wings. Obviously the two measurements just described can be taken only from the fresh specimen and only an approximation can be made from the dried skin or the mounted bird. Careful collectors are supposed to take both these measurements and record them on the label tied to each skin, but for various reasons, largely lack of time, this is not always done. Hence the measurements on which the student must depend are those which are practically the same in the skin as in the fresh bird. It is found that little change takes place in the length of bill, feet, wings, or tail in drying, and hence measurements of these parts are more commonly used and give better satisfaction. Four measurements are constantly used in the keys and descriptions in this work and it is important therefore that the student should understand exactly how these are taken. First, length of wing or simply "wing." This is obtained from the closed wing by slipping a scale beneath the wing, placing one end of the scale exactly at the tip of the wing and marking the point reached by the shoulder or main bend of the wing in front. A better way, especially for small birds, is to use a pair of compasses, but the measurement should always be taken from below, being in fact the chord of the curved wing. The figure of the snipe's wing (Figure 52) illustrates this; the greatest distance which can be measured on this cut is the length of the wing. Second, length of tail or "tail." This is practically the length of the longest tail feather, but since the tail feathers are embedded in the muscle and other tissues of the "pope's-nose" it is necessary to add a little to the actual visible length of the longest tail feather. Hence it is customary to feel for the root of the tail, place one leg of the compasses in the center of the pope's-nose, and extend the other leg of the compasses to the end of the longest feather, the distance thus obtained being the length of the tail. Third, length of bill. Usually this means the same as length of culmen, the culmen being the profile or upper outline of the bill, and its length is obtained with the compasses by taking the distance in a straight line from the tip of the bill to the point where the ridge of the upper mandible meets the feathers of the forehead. This is really the chord of the culmen. In long-billed birds like snipe and sandpipers, which have little gape, this measurement is very nearly the same as the length of the bill, but in sparrows, hawks, swallows and a host of other birds, the measurement from the tip of the bill to the corner of the mouth would be very different from the length of culmen obtained as above Fourth, length of tarsus or simply "tarsus." The tarsus of course is the shank, or what is loosely spoken of as the leg, and the measurement sought is the distance from the heel joint (wrongly called the knee) to the junction between the shank and the foot proper. This measurement should always be taken with the compasses and on the front of the shank, one point being placed at the junction between the upper leg, or tibia, and the shank, or tarsus, while the other point should reach the suture or crease which separates the shank from the root of the toes. When the legs are long and naked this measurement can be taken quickly and accurately; if the legs are more or less feathered the measurement becomes somewhat less definite, but on the whole the length of tarsus is one of the most important data used in bird identification. Reference to the various figures of bill, foot and wings, scattered through the text, will make still more clear the preceding directions.

Of course other measurements are frequently called for, some of those in most general use being the length of the toes, either with or without the claws or nails, and it is probably safe to caution the beginner not to confound the toes with the claws. The claw or nail forms the terminal segment of each toe, and its length is of course a totally different thing from that of the entire toe. A bird's foot as a rule has four toes and these are most often arranged with three pointing forward and one backward, the latter consequently being called the "hind toe." It is also spoken of as the "first toe," while the front toes are numbered respectively 2, 3 and 4, number 2 being the inner toe, number 3 the middle toe and number 4 the outer toe. In most birds which run freely on the ground and seldom use the feet for grasping a perch or other object, the hind toe is apt to be somewhat elevated above the level of the front toes and it may be quite short or even entirely wanting. In some other birds two toes point forward and two backward, this arrangement being known as yoke-toed, and as a rule it is the outer or fourth toe which is turned backward, although there are cases in which the inner or second toe takes this position.

The nomenclature of the wings, including the primaries, secondaries, tertiaries, greater, middle and lesser coverts, etc., etc., will be best learned by referring to Plate I and the various text figures. It should be noted, however, that the primaries are always nine or ten and are numbered from the tip or free border of the wing toward the body, number one being the outermost primary and number nine or ten, as the case may be, that primary which is followed directly by the first secondary. When the statement is encountered "second or third primary longest" it must be understood that the actual length of the entire primary is not meant, but merely that in the folded or partly opened wing the tip of the second or third primary extends beyond the tips of any of the others.

It is not practicable in this place to anticipate and explain all the difficulties which the beginner will experience in attempting to use the artificial keys, but enough has been said to enable him to make a beginning, and with constant reference to the figures and glossary, and especially with the exercise of good sense and fair judgment one should learn very quickly to use these keys successfully. At the risk of being tedious, it should be repeated once more that no measurement should ever be guessed at; the compasses and a measuring rule should invariably be at hand and only in the most obvious cases should their use be omitted.

AN EXAMPLE OF THE USE OF THE KEYS.

Suppose we have in hand a freshly killed specimen of one of our small fresh-water ducks. Starting with the Artificial Key to the Larger Groups (page 33) we find the first line, prefaced by a single capital A, to read, "Distinctly web-footed.—B, BB, BBB." Examination of the bird's foot shows that it is a typical swimming foot, the three front toes being connected with membrane or web. If in any doubt we should look for the alternative under the heading AA, which appears farther down the page and is found at a glance because it begins at exactly the same distance from the margin as the line A. But AA reads, "Imperfectly or not at all web-footed," which evidently does not answer for our bird. So we come back to line A and consider the references following it, B, BB, BBB. The three lines beginning with B all relate to the hind toe, and as our bird has a hind toe which is not connected with the front toes by a web it evidently agrees with BB. This in turn is followed by the references E and EE, and on reading the lines so headed and examining our specimen we find the condition described under E, namely the "cutting edges of the bill with comb-like ridges." The reference following this line takes us to the Order Anseres, Ducks, Geese and Swans, where another key awaits us.

The short neck, dark color and small size debar our specimen from the group of swans, and its comparatively short legs and long toes exclude it from the geese and confirm our belief that it belongs with the ducks.

The key to the species of ducks looks somewhat formidable, but it should be remembered that we need only consider one or two points at a time. The short, broad bill, with its strainer-like plates sends us at once to AA, and then to decide between C and CC. Here a little investigation may be necessary, but a glance at the cut of the Ruddy Duck will show that it is quite unlike our specimen and we select CC as the right path. In order to determine now whether D or DD is applicable to the case in point the student should compare figures 15 and 21 and then carefully examine the hind toe of the specimen. The result points clearly to D and places this bird among the "River and Pond Ducks," with the references E and EE to be considered. Although evidently not a very large duck, it is not safe to assume that it belongs under E without actual measurement. With a pair of compasses the exact distance from the front edge of the shoulder (in the closed wing) to the tip of the longest primary must be determined, and since this proves to be less than 8½ inches we are justified in calling the duck a teal (F or FF). The light blue shoulders are quite distinctive and our specimen may be labeled Blue-winged Teal, provisionally. It remains to turn to the full description of this species on a following page, confirm our diagnosis, and try to decide whether this individual is male or female, adult or immature.

As a second example of the use of the artificial key let us take the common Blue Jay. Starting with the Key to the Larger Groups, we find that our specimen agrees successively with the following lines:

AA. Not at all web-footed.
  GG. Tibia feathered down to heel joint ("knee").
    QQ. Upper mandible without cere or soft membrane at base.
      TT. Three toes in front.
        VV. Nail of middle toe not pectinate.
          WW. Tail feathers not spine-tipped.
            XX. Birds more than four inches long.
              YY. Hind toe and claw more than half as long as middle toe and claw.—Passeres.

This shows that our specimen belongs in the order Passeres or Perching Birds, and we turn to the key to the members of that group. Here we find a Key to Families, and following the same plan as with the previous key we decide that our bird agrees successively with the lines:

2. Upper mandible imperfectly or not at all hooked, toothed, or notched at tip.

  CC. Tips of folded wings not reaching to tips of middle tail feathers.
    EE. Tail not tipped with bright yellow.
      FF. First primary about one-half the length of the longest.
        N. Tail feathers with soft, rounded tips.
          OO. Wing 5 inches or more. Family Corvidae.

Under this heading, we find a Key to Species which gives us in regular order:

AA. Smaller birds, wing less than 10 inches, plumage not all black.
  CC. Tail moderate (about 6 inches), somewhat rounded at tip. (This refers not to the tips of the individual tail feathers, but to the outline of the whole end of tail.)
    D. Head with a conspicuous crest; plumage largely blue—Blue Jay.

Turning now to the full description of this species, and noting the measurements of total length, wing, tail and bill, it is easy to confirm the identification. Incidentally it may be noted that in spite of the fact that the Blue Jay is conspicuously blue, the question of color is encountered but twice in the passage through the keys, once in the key to the families ("tail not tipped with yellow"), and again at the end of the key to species, where "plumage largely blue" is the final characteristic which marks the Blue Jay, although even here it is a secondary consideration since the "conspicuous crest" is of first importance. Of course it would be possible to make an artificial key using color as the most important feature, which would lead us more directly to the Blue Jay, but it would be a very difficult matter to make such a key equally good for the many other species which would have to be considered, for there are at least eighteen other Michigan birds, belonging to twelve different families, which have more or less blue in their plumage, and several of them (Kingfisher, Blue Heron, Tufted Tit) are also conspicuously crested. Moreover, questions of color are often very difficult ones, the average individual being unable to discriminate shades nicely, or at least to name them accurately. Color, therefore, has been kept out of the artificial keys so far as practicable, and the aim has been to select characters for consideration which are clear, definite and readily recognized, so that the student can tell at a glance whether the specimen before him possesses that character or not.

Technical terms will be found defined in the glossary near the end of the volume, and most of the important structures used in classification are illustrated by text figures, a list of which follows the table of contents at the beginning of the book.

MIGRATION.

The Century Dictionary defines migration as follows: "The act of migrating; change of residence or habitat; removal or transit from one locality or latitude to another, especially at a distance." In further explanation the same authority adds, "Migration seems to be determined, primarily and chiefly, by conditions of food supply, but this does not fully account for the apparently needless extent and the wonderful periodicity of the movement, nor for the fact that individuals sometimes return to exactly the same spot to breed again after passing the winter perhaps thousands of miles away."

The term migration as applied to birds is familiar to every one, and the fact that many of our birds desert us each autumn and return in the spring is so familiar that even the most unobservant can scarcely have failed to note it. The more careful student will have seen, however, that not all our birds leave us in fall, and possibly he may have guessed also that those which return in the spring are but a fraction of those which withdrew the previous year. In all the life-histories in the present work reference will be found to the character of residence, and in those species which migrate regularly an attempt is made to give approximately the dates of arrival and departure. It must be remembered, however, that Michigan covers a long distance from north to south (more than 400 miles) and that dates will vary much with latitude and other conditions. It seems wise therefore to devote a few pages here to a consideration of the facts of bird migration in general as well as in our own state.

Considering merely the condition of residence we may divide our birds into four groups: First, residents or permanent residents, those which are with us all the year. Second, summer residents, or summer visitors, those which nest with us. Third, transients, or birds of passage. Fourth, winter visitors or winter residents.*

Not a few of our common birds are residents in one part of the state and only summer visitors or even transients in another, while other species come regularly or occasionally into the northern parts of the state in the winter but never reach the southern counties. The Snow Bird or Junco and the White-throated Sparrow are transients in the southern half of the state, but summer residents in the northern half; while the Meadowlark and Mourning Dove are only summer visitors in most of the state, but permanent residents in the southernmost counties. For present purposes we may almost disregard the so-called permanent residents, merely remarking that although several species, including Woodpeckers, Chickadees, Creepers, Grouse, and Owls, may be well represented throughout the year in any given locality, we have little proof that the individuals representing these species are the same, and there is every reason to believe that, with a few exceptions, every species of Michigan bird is more or less migratory in some part of its range. Apparently the Ruffed Grouse and the Prairie Chicken are stationary in Michigan wherever found, yet we know positively that in Minnesota, Iowa, and other trans-Mississippi states this last named species makes a well marked though not very extensive southward migration in autumn, returning northward, however, so gradually and quietly that it attracts little attention.

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* Much of what follows on this subject is taken verbatim from the author's paper entitled "Fact and Fancy in Bird Migration." Eighth Rep. Mich. Acad. Science, 1906 (1907), pp. 13-25.

In attempting to study migration as it occurs in this country the solitary observer works at a great disadvantage. Even in the most favorable location and with the best equipment in the way of education and time, such an observer can do little more than record the observed facts and trust that the opportunity may come sooner or later when he or some one else may combine his observations with thousands of others and in this way accomplish something definite toward the solution of what must be considered one of the greatest mysteries of nature. In 1896 the great British naturalist, Alfred Newton, said of bird migration, "We are here brought face to face with the greatest mystery which the whole animal kingdom presents, a mystery which attracted the attention of the earliest writers and can in its chief point be no more explained by the modern man of science than by the simple minded savage, or the poet or prophet of antiquity. The flow and ebb of the mighty feathered wave has been sung by poets and reasoned of by philosophers, has given rise to proverbs and entered into popular superstitions, and yet we may say of it still that our ignorance is immense."

Fifteen years have added much to the total of our knowledge of birds, yet the gain in that time has come also through subtraction, for we have been compelled to unlearn much that was once considered fixed and sure. The attempt today to sift the known from the unknown in this matter is a task of such gigantic proportions that any scientist may well hesitate before the undertaking. It is scarcely possible to exaggerate the mystery, superstition and absurd speculation which has been thrown about this subject. Educated writers within the last hundred years have seriously advanced the theory that birds leave the earth entirely during winter and migrate to the moon, also that swallows and some other species plunge into lakes and streams and pass the winter buried like frogs beneath the mud. Hardly less absurd are the claims that migrating birds are guided by an instinct or by some unknown sense which enables them to travel safely and securely both day and night over thousands of miles of land and sea and to arrive at last with unerring certainty at the end of a journey, every step of which was foreseen from the first.

No doubt many species make long journeys safely and rapidly, but we now know that a heavy percentage of loss of life goes with every movement. Undoubtedly certain individual birds find their way back to their birth place after a trip of hundreds of miles and an absence of many months; but it is more than likely that where one individual succeeds in doing this many more fail. Thanks to patient investigation and careful exploration we now know pretty accurately where most of our migrants spend their winters, and we have much reliable information as to the general routes by which some of them go and return, and even the approximate time occupied by the *species* in making the trip, but no sane man pretends to say how long it takes any *individual* bird to travel from the Gulf of Mexico to Lake Winnipeg,—or even from the Ohio River to the Saginaw Valley.

Formerly well-known scientific men spoke rather confidently of certain birds as migrating only by day and of others which journeyed only at night; possibly there may be a few species which can still be placed in one or the other category, but the number is dwindling every year. The old argument—that because a peculiarly marked robin had nested for three consecutive summers in the same tree, therefore all robins regularly return to the places of their birth; or that because certain sparrows and warblers were killed by flying against light-houses, therefore these kinds migrated only at night; such reasoning—if it can be so called—has given place largely to better logic and the student of today is beginning to demand absolute proof of many of the statements which were accepted as established facts fifty years ago.

A good example of the summer resident is found in the Purple Martin which usually arrives in southern Michigan from the 1st to the 20th of April, nests during May and June, and again moves out of the state before the middle of September, thus spending only five of the twelve months with us. In 1884 the northward movement of these birds was noted from the time they entered the Mississippi Valley, the last of February, until a few arrived at Oak Point, Manitoba, on May 23. The distance from New Orleans to Oak Point is about 1,440 miles and apparently about ninety days were consumed in making the trip, an average of but sixteen miles a day. However, Prof. W. W. Cooke, who collected the data, was convinced that the forward movement was confined to twelve days (he says nights), which would make the average about 120 miles per day for the twelve days of travel.*

This is a bird of such swift and powerful flight that it is perfectly possible for it to speed northward 150 to 200 miles with a warm southerly wind and yet retrace its course the next day in case the weather becomes inhospitable. It seems reluctant to retreat, however, and too frequently the early Martins which are caught by severe cold weather die from starvation. Their food consists almost entirely of insects caught on the wing, and when the temperature drops anywhere near the freezing point very few insects continue to fly. A few benumbed stone-flies may be picked from twigs and grass-tips, but not enough to supply heat and strength for these muscular and active birds. The Martin spends the winter entirely south of the United States, some lingering in Mexico and the West Indies, but more pushing far south into Central or even South America.

Again we have birds like the Longspurs, the Pipits, Rusty Grackles, and White-crowned Sparrows, Yellowlegs and Ring-neck Plover, Canada Geese, and many ducks, which are strictly birds of passage, or what we prefer to call transients, seen only for a few days or weeks in spring as they pass from their winter quarters in the south to their nesting grounds beyond our northern confines, and again for a few days in fall on their return journey accompanied by the young just reared. Yet another group of transients, better called winter visitors, should be mentioned which come to us in autumn or winter from the north and after spending a longer or shorter time with us again withdraw polewards; such are the Snowy Owl, Great Northern Shrike, the Pine Grosbeak and two kinds of Crossbills, together with Redpolls, Snow

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*Bird Migration in the Mississippi Valley, Bul. 2, Div. Econ. Ornith., U. S. Dept. Agr. 1888, pp. 224-225.

Buntings, and the much less common Evening Grosbeak and Bohemian Waxwing.

We may study the main features of migration to best advantage among those species in which the whole body of individuals swings northward and southward periodically and for long distances, at least 20° to 25° of latitude or 1,200 to 1,500 miles. Among these are representatives of the most diverse orders and families with many peculiar and exceptional cases, yet much general agreement as to the main facts. Some go openly, in immense flocks, by day and in fair weather, as the swallows, sandpipers and crows; others, like the cuckoos, flycatchers and rails, are commonly believed to go singly and at night, and they drop away so stealthily, even mysteriously, that this supposition seems justified. Many waterbirds, geese, ducks, and others, seem to wait for storms of wind or rain and to delight in making their long flights in or just before tempestuous weather.

One of the older and seemingly well-grounded beliefs was that many of the smaller and presumably weaker migrants travelled entirely at night, partly to avoid the attacks of hawks and partly that they might rest and feed by day. The fact that multitudes of such birds do travel at night is undeniable, and perhaps the most marvelous demonstration of this is the discovery (first announced in October, 1880, by W. E. D. Scott) that this migration could be watched easily with a telescope trained on the face of the full moon within a few hours of the horizon. Yet the fact seems to have been very generally overlooked that night flying does not preclude day flying, and that millions of small birds might pass over our heads at midday and in fair weather, and yet be just as invisible as at midnight, provided they flew at the heights claimed for the nocturnal migrants. Similarly, the fact that birds appear by thousands about lighthouses and electric lights during cloudy and foggy nights carries not the slightest proof that the same species do not travel just as freely by day. As a matter of fact we know that almost all the species killed at lighthouses do make long flights by day under favorable conditions, and an examination of all the accessible evidence leads me to assert that most birds do not fly at night to avoid enemies or escape observation, but merely to take advantage of favorable conditions as yet but partially understood. Telescopic observations at night have shown many small birds flying at heights of from one to three miles, and even at a height of a mile most of the same birds would be entirely invisible to the unaided eye in a clear sky at noon. Moreover, telescopic observations by day—the telescope trained on the sun—have shown in at least two cases birds flying at great heights, far above the reach of our unaided eyesight, and in one of these cases the birds were migrating southward in enormous numbers.

Different observers of nocturnal migration, using different instruments under similar conditions (that is always against the face of the full moon) have recorded birds migrating at heights estimated all the way from 600 feet to 15,100 feet, and moving at all speeds from nearly stationary up to 134 miles per hour, with an average of sixty-seven miles per hour for small birds of ordinary powers of flight.

I have not the least desire to belittle the discoveries of these pioneer observers, or to cast any reflection on their honesty of purpose or the accuracy of their records, yet I am free to say that until we have very many more observations in corroboration of these I cannot but doubt that any of our birds, large or small, at any height or under any circumstances, attains a speed even approximating 100 miles an hour. At a height of little more than three miles the density of the atmosphere is only half that at the sea-level, hence its resistance to the passage of a bird at that height would be lessened one-half. It does not follow, however, that therefore a bird at a height of three and one-half miles can fly at double its speed at the surface without increased effort. A moment's thought will show how preposterous is such a claim. The very tenuity of the air, which lessens by one-half the resistance to the forward motion of the bird, must lessen in exactly the same proportion the supporting power of the air and its resistance to the wing-strokes, which alone give the bird headway. We may dismiss as absurd the claim that birds may double their speed by flying in rarified air.

After careful search I have been unable to find a single instance in which the speed of any bird has been shown by actual measurement to reach over 100 miles per hour. There are plenty of guesses, a few bold but unsupported assertions, and a number of more or less probable estimates.

The figures furnished by pigeon fanciers give us some idea of the possibilities of the homing pigeon, so often miscalled the "carrier pigeon." These records of course give only the average speeds, but these are certainly suggestive. The greatest velocity of which I find mention is eighty miles an hour, at which rate a homing pigeon *is said* to have covered 114 miles in 1892. I am unable, however, to verify this statement. Another, and more likely record, is seventy-one miles an hour for a distance of eighty-two miles, while the average velocities of the winners in a large number of contests do not exceed forty miles an hour. In 1883 the best time made in eighteen races was 208 miles at the rate of fifty-five miles per hour. Over longer distances the velocity is very much less, and in the longest flight of which I can find a record, that of a pigeon which flew from Pensacola, Florida, to Fall River, Mass., fifteen and one-half days were consumed in covering the 1,183 miles, the average speed being seventy-six miles *per day.*

In experiments tried with swallows in France it is *claimed* that one swallow flew 160 English miles in ninety minutes, giving a velocity of 107 miles an hour, but this record is open to serious question.

Wild geese, and especially wild ducks, have been credited with a speed of nearly 100 miles an hour, yet in two cases where it was possible to measure the speed of flocks passing a given point, it was found that the geese flew at the rate of but 44.3 miles per hour, and the ducks at approximately forty-eight miles per hour, and in neither case did the height exceed 1,000 feet. These measurements were made at the Blue Hill Meteorological Observatory at Milton, Mass., by trained observers with the instruments used daily in determining the velocity of clouds.* In 1893 Dr. Hubert L. Clark noted two Buffle-head ducks flying along the Potomac River parallel with a train on which he was a passenger. The train was found to have a speed of about thirty-seven miles an hour, and the ducks were unable to keep up with it.

Heinrich Gatke's statement that the Golden Plover flies at the rate of over 200 miles an hour is based on data which he misunderstood or misrepresented. He states positively that the Golden Plover migrates in autumn from Labrador to Brazil, over the Atlantic in *one uninterrupted* flight of 3,000 miles! He further assumes (without explanation) that fifteen hours is the longest time any bird could remain on the wing without food, and hence that the above flight of 3,000 miles is made in fifteen hours, at an average speed of "212 geographical miles an hour."† He does not explain exactly why this speed is 212 miles instead of precisely 200 miles per hour, as we should figure it, but we need not quibble about a paltry dozen miles in the case of birds moving with such meteoric swiftness. There is absolutley no proof that any of these plover pass from Labrador to Brazil *at one flight*, nor do we know even approximately the time taken for the trip as performed. Presumably they do make flights of 300 to 400 miles without rest, since they are often seen passing Bermuda without resting, and have *probably* flown continuously since leaving the North American coast; yet should they tire there is no reason whatever why they should not rest upon the sea at any time except during storm, and it is well known that in case of heavy storms thousands of them do alight on the Massachusetts coast, as well as on Bermuda, while the species lingers regularly for weeks on some of the West Indian Islands.

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*Science, New Series, V, pp. 26, 585-586.

†Heligoland as an Ornithological Observatory, Edinburgh, 1895.

Doubtless one reason why migrating birds fly at great heights in fair weather is because it is easier. So long as the breeze is in the right direction they utilize it to the full, but if compelled by circumstances to face a wind they find it far easier to fly near the surface where they can take advantage of such eddies and counter currents as may appear, and where at all events the velocity of the wind will be less than at higher levels. Another and possibly the strongest reason for flying at great elevations lies in the fact that the view thus obtained is of paramount importance to the migrant. At a height of two miles a bird in clear weather commands a view of an area nearly 200 miles in diameter, so that under favorable conditions, it might cross any of our great lakes, or even reach South America by way of the West Indies without ever being out of sight of land. Should the weather become unfavorable, however, after a start has been made, the little travellers must make the best of a bad matter and meet the emergency as best they may. Were they gifted with the extraordinary powers popularly assigned them they would rarely or never be caught and overwhelmed as they so often are. Were they able to fly even seventy-five miles an hour, they could flit to safety on the first appearance of bad weather, well knowing that a few hours of clear weather would enable them to recover all the ground lost. In spite of the general belief that birds are able to foretell meteorological changes and forestall dangerous storms, the weather is very largely responsible for the terrible destruction which thins their ranks and brings death to so large a proportion of our bird population every year.

In the winter of 1894-95 most unfavorable conditions in the south nearly annihilated the Bluebird and so far reduced the number of Robins reared in this section of the north that their normal numbers were not regained for at least six years.

It is clear that, on the average, as many birds die each year as are born, else the individuals of any species would increase in numbers year by year until they became intolerably abundant. As it is, some species increase for a time and then their numbers fall away again. There is a constant oscillation in numbers with occasional decrease to such a point that recovery becomes impossible, and the species becomes extinct. Ordinary minor oscillations may occupy but a few years, but more often apparently one or more decades may be required for the completion of such a cycle.

We have no time to go into the causes of mortality among birds, but it is evident that a very large percentage of the young and inexperienced birds which start south in autumn never return to their birthplace—probably having perished from the dangers of the trip. As a rule the southward journey is made—or at least might be made—with comparative safety. There is no need of great haste, food is abundant and the travellers are moving always toward regions of increasing warmth and superabundant food. On the northward trip on the contrary, the birds often are leaving safety and abundance behind them, are pushing continually into colder and hungrier regions, and are likely at any moment to be met with climatic conditions that test their strength and endurance to the utmost and often exact the extreme penalty of death. Take an instance in illustration of this statement. April 2, 1881, Mr. A. M. Frazar was a passenger on a sailing vessel about thirty miles off the mouths of the Mississippi, with a moderate east wind blowing and no land birds in sight. Suddenly, about noon, the wind changed to the north and increased to a gale, and within an hour birds of many species appeared, singly and in small flocks, having come down from far overhead to escape the force of the wind. All were flying toward the land, directly to windward, and in the teeth of the growing storm. "Within a few hours," says Mr. Frazar, "it had become a serious matter with them, as they could make scarcely any progress. As long as they were in the trough of the sea the wind had little effect on them, but as soon as they reached the crest of a wave it would catch them up and in an instant they were blown hundreds of yards back or else into the water and drowned. * * * It was sad indeed to see them struggling along by the side of the vessel in trying to pass ahead of her, for as soon as they were clear of the bows they were invariably blown back into the water and drowned. Most of those which came aboard (considerably over a hundred) were washed into the sea again."* Twenty-three different species were identified, including warblers, finches, flycatchers, and a single swallow, hawk, dove and turnstone. Probably these were all migrants which had nearly crossed the Gulf of Mexico from the Peninsula of Yucatan, only to be swallowed up by the angry sea when almost within sight of their goal.

Another observer describes the disaster caused to birds on Lake Michigan by a violent storm in September, 1879, as follows: "The eastern shore of Lake Michigan was strewn with dead birds. I took pains to count those on a certain number of yards, and estimated that if the eastern shore was alike through all its length, over a half a million birds were lying dead on that side of the lake alone. It is more than likely that nearly as many more were on the west. It was a strange and pitiful sight." There were wrens, creepers, kinglets, robins, kingbirds, warblers, sparrows, finches, woodpeckers, and even a few blue jays and kingfishers. Here apparently temperature played no part, but wind and heavy rain baffled the little migrants whichever way they turned, and finally beat them down into the relentless waves.

Still another example of the dangers run by birds in migration is found in the record of a disaster on the eastern shore of Lake Huron in the autumn of 1906.† On the 19th of October, 1906, Mr. W. E. Saunders of London, Ontario, received word from a correspondent at Forest that he had spent the previous day on the Lake Huron shore near Port Franks and had observed hundreds of birds on the shore dead, cast up by the waves. He estimated five thousand dead birds to the mile and on the 21st Mr. Saunders visited the region and examined the beach southward from Grand Bend. His account of the disaster is given in his own words: "After covering several miles and seeing only a few dead birds, I came at length to the region of death. At first the birds were not very close together, but eventually became so plentiful that in one place I put my foot on four, and saw as many as a dozen in four or five feet. I began a census at once, which I continued until the lengthening shadows warned me to hurry on to the river so as to cross in daylight, but in the two or three hours spent in the count I recorded 1,845 dead birds, representing twenty-six different species. After consuming all the time I could spare in this work, I walked over two miles or so of beach, where the birds were more common than on the shore where the count was taken; this brought me within half a mile of the mouth of the Sable river and I then crossed it and turned my steps inland to a railway station. * * * After my return I wrote to various persons near the lake shore. * * * It appears that from below Grand Bend the birds were very numerous until beyond Stony Point, but toward Kettle Point they diminished and were not plentiful again until Blue Point, beyond which they were 'laying six deep in one place.' * * * The northeastern section, of which I covered perhaps two miles, would have approximately one thousand birds to the mile, and the whole section might be perhaps ten miles; the western section was probably thickly covered, but the length is unknown, possibly three miles, or perhaps even ten."

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* Bul. Nutt. Orn. Club, VI, 1881, 250-251.

† A Migration Disaster in Western Ontario. The Auk, XXIV, 1907, 108-110.

The weather conditions which resulted in this tragedy are thus described by Mr. Saunders: "The early days of October, 1906, were warm and damp, but on the sixth came a north wind which carried the night temperature down to nearly freezing. Near there it stayed with little variation until the tenth, and on the tenth the north wind brought snow through the western part of Ontario. At London there was only two or three inches, which vanished early next day; and the thermometer fell to only 32 degrees on the night of the 10th, and to 28 on the 11th, but ten miles west there was five inches of snow at 5 p. m. October 10, and towards Lake Huron, at the southeast corner, between Goderich and Sarnia, the snow attained a depth of nearly a foot and a half, and the temperature dropped considerably lower than at London. On that night, apparently, there must have been a heavy migration of birds across Lake Huron, and the cold and snow combined overcame many of them, so that they fell in the lake and were drowned."

It should be noted that in all probability the destruction of these birds took place on the night of October 10-11, and that this is an exceptionally early date for severe cold and heavy snow. Among the birds overtaken by this disaster, the species most strongly represented appear to have been the Winter Wren, Swamp Sparrow, White-throated Sparrow, Tree Sparrow, Junco, and Golden-crested Kinglet. Mr. Saunders counted 417 Juncos in the total of 1,845 birds alluded to.

We have no time to discuss the alleged power of birds to divine coming storms, nor can we enter into a consideration of such instincts as should save them from disasters like those just described. I have tried to show already that they possess no such extraordinary powers of flight as are ascribed to them by popular writers, and had we the time, it might be shown, I believe, that at least for a very large part of their migratory flight they do not follow fixed paths, nor do they retrace their footsteps—or better, wing-beats—through memory. That certain great natural highways exist, I have no doubt, but certainly part of the throngs of birds which use them do so not because they have ever used them before, or even because their ancestors used them, but because the same forces which led to their use then are still operative and because these routes are the easiest and best paths to the regions desired.

Natural highways, recognized as such by all well informed bird-students, are the valleys of rivers having a general north and south trend, especially the larger rivers. Famous examples of such highways are seen in the Mississippi and the Red River of the north which combine to form a path along which millions of birds pass annually between Louisiana and Manitoba, while other millions diverge into the larger tributary valleys, such as the Arkansas, Missouri, Ohio and Wisconsin. Shorter but equally popular valleys are those of the Connecticut, the Hudson, the Potomac, the Susquehanna and the Genessee, every one of which is noted for its throngs of migrants both spring and fall.

The larger Michigan rivers all trend rather east and west than north and south and perhaps for that reason no one of them seems to have acquired fame as a migration route. True the Detroit and St. Clair rivers form a famous route for waterfowl, and it is no uncommon thing for ducks, geese, swans and gulls to pass Detroit in large numbers, flock often following flock in seemingly endless procession. Yet apparently Detroit is avoided by the greater throngs of land birds, the main stream of migrants passing some twenty miles east of the city, and one branch of this stream entering the state at Port Huron and flowing northward along the Huron shore, across the mouth of Saginaw Bay and eventually across the head of Lake Huron and the eastern end of the Upper Peninsula, into the relatively unknown regions of northern Ontario.

Doubtless most Michigan migrants arriving from the south enter the state directly from Ohio or Indiana, and according to the generally accepted theories many of them, if from the far south, have come up the Mississippi valley to the mouth of the Ohio River, followed this valley to the northeast and ascended some one of the tributary valleys from the north,—the Wabash, Miami, Scioto, etc., to the sources of these streams, and then by the Maumee, Sandusky and Huron rivers to Lake Erie or to the Ohio-Michigan line. Birds arriving on the Lake Erie shore at or east of Sandusky are known to cross the western end of Lake Erie by a route which takes them over Kelly and Pelee islands, as stepping stones, to Point Pelee in Ontario, a long, sandy, partly wooded point which stretches out nearly ten miles into Lake Erie. Continuing this journey northward from the point part of the migrants pass up the eastern shore of Lake Huron (Georgian Bay), while the remainder, as already noted, proceed directly north to the southern end of Lake Huron, crossing then into Michigan territory and proceeding northward along the western shore of Lake Huron.

Possibly the Wabash Valley column may supply most of the migrants which enter southwestern Michigan, while those which use the Miami and Scioto valleys reach southeastern Michigan, or cross Lake Erie by the Pelee route, but it must be remembered that by no means all migrants follow river valleys, and especially in regions like the Indiana-Ohio-Michigan area, where the country is comparatively flat and everywhere well watered, there is every reason to believe that little use is made of the streams in directing the birds northward.

It should also be clearly understood that there is certainly a well marked migration, both northward and southward, through Ohio and Indiana which is entirely independent of the Mississippi and Ohio valleys, the birds coming directly over the mountains from the South Atlantic and Gulf states to the Ohio valley, and very possibly completing their northward movement without any reference to the direction of water courses.

It has been commonly assumed that land birds would prefer not to cross large bodies of water if they can be conveniently avoided, but while this may be true of birds migrating by day, it is certainly not true of all nocturnal migrants, and the records of birds killed at lighthouses, both along the seacoast and on the Great Lakes, makes it pretty clear that very many species are quite indifferent as to whether their course lies over land or water. We know that hawks, swallows, and some other day-migrants seem reluctant to venture out onto sea or lake, and prefer to "coast alongshore" in the direction which takes them most nearly where they wish to go; but this may very likely result from the fact that these birds must feed more or less as they travel, and it demands no extraordinary intelligence to foresee the scarcity of food if they pass out over the sea or any large body of water. Just how far birds follow "blind instinct" (whatever that may be) in these trips and how far they act as intelligent beings is a moot question at present. One might suppose, after studying the map of the Great Lake region, that birds passing northward from the Lower Peninsula of Michigan would endeavor to cross into the Upper Peninsula at or near the Straits of Mackinac, but so far as we can learn birds are no more numerous during migration at that point than any other, and the fact that thousands of birds are killed annually at Spectacle Reef Light at the head of Lake Huron, quite a distance east of the Straits, would seem to show that the migrants—at least at night—take a direct north and south course without regard to the amount of land or water to be crossed.

SOME USEFUL BOOKS OF REFERENCE.

(A) Large works to be found in most libraries.

1. Baird, Brewer & Ridgway. History of North American Birds. Land Birds, Vols. 1, 2, 3. Water Birds, Vols. 1, 2. Little, Brown & Co.
2. Robert Ridgway. Birds of North and Middle America. Bull. 50, U. S. National Museum, Vols. 1, 2, 3, 4 (5 in press). No life histories.
3. Elliott Coues. Key to North American Birds, 2 vols. Dana Estes & Co., Boston, 1905, 5th ed. ($10.00).
4. Capt. Chas. Bendire. Life Histories of North American Birds, 2 vols.: Smithsonian Contributions to Knowledge, Vol. 28, 1892, and Vol. 32, 1895. Land Birds from Raptores to Icteridæ, with many fine colored plates of eggs.
5. Henry Nehrling. Our Native Birds of Song and Beauty. 2 large vols., 36 colored plates. Geo. Brumder, Milwaukee, 1893.
6. Howard Elon Eaton. Birds of New York. Memoir 12, N. Y. State Museum, Vol. 1, 1909 (Vol. 2 in press). About 50 colored plates in Vol. 1.

(B) Smaller works, some of which every bird student should own.

7. Robert Ridgway. Key to North American Birds. J. B. Lippincott, 1 vol.
8. Frank M. Chapman. Handbook of Birds of Eastern North America. Sixth (or later) edition, 1904. D. Appleton & Co., New York, $3.00.
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11. Frank M. Chapman. Bird studies with a Camera. D. Appleton & Co., 1903. No colors. $1.75.
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19. Florence Merriam Bailey. Birds of Village and Field. Houghton Mifflin & Co., 1898, 300 illustrations, $2.00.
20. Florence Merriam Bailey. Birds Through an Opera Glass. Houghton Mifflin and Co. $.75.
21. Chester A. Reed. Bird Guide, Part I. Water Birds, Game Birds and Birds of Prey. Worcester, Mass. 50 and 75 cents.
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23. J. H. Langille. Our Birds in their Haunts. S. E. Cassino & Co., Boston, 1884. Out of print.
24. W. W. Cooke. Bird Migration in the Mississippi Valley. Bull. 2, Division of Economic Ornithology, U. S. Dept. Agr., 1888.
25. Florence Merriam Bailey. Handbook of Birds of the Western United States. Houghton, Mifflin & Co., 1902. 33 plates and 600 cuts, $3.50.
26. Montague Chamberlain. Popular Handbook of the Ornithology of Eastern North America. By Thomas Nuttall. Little, Brown & Co., 2nd edition, 1896. 2 vols.
27. Weed and Dearborn. Birds in their Relations to Man. J. B. Lippincott Co., 1903.
28. Edward H. Forbush. Useful Birds and their Protection. Mass. State Board of Agriculture, Boston, 1907.
29. D. Lange. Our Native Birds, How to Protect them and Attract them to our Homes. Macmillan Co., New York, 1899. $1.00.
30. Gilbert H. Trafton. Methods of Attracting Birds. Houghton, Mifflin & Co., 1911.
31. Biological Survey, U. S. Department of Agriculture. Various bulletins and reports on birds. Washington, D. C., 1885 to date.
32. The Auk. A quarterly journal of ornithology, and the official organ of the American Ornithologists' Union. Annual subscriptions $3.00. Jonathan Dwight, Jr., Treasurer, 134 West 71st st., N. Y. City.
33. Bird Lore. A bi-monthly journal devoted to birds, and the official organ of the American Audubon Societies. Published by the Macmillan Co., Crescent and Mulberry Sts., Harrisburg, Pa. Annual subscription $1.00.

34. The Wilson Bulletin. Official organ of the Wilson Ornithological Club. W. F. Henninger, Treasurer, New Bremen, Ohio. Annual subscription $1.00.
35. Bulletin of the Michigan Ornithological Club. Vols. 1 (1897) to VI (1905), with some omissions. Publication discontinued in 1905.
36. A. O. U. Check List of North American Birds. (Check List prepared for the American Ornithologists' Union) Third Edition, 1910. Price, $2.50. Address Jonathan Dwight, Jr., 134 W. 71st St., N. Y. City.

ARTIFICIAL KEY TO THE LARGER GROUPS.

A. Distinctly web-footed.—B, BB, BBB.

B. No hind toe, 3 front toes fully webbed.—C, CC.

C. Wings long; tail well developed.—Kittiwake Gull, Family Laridæ, page 50.

CC. Wings short, tail soft, short and hardly visible.—Family 3, Alcidæ, Auks and Murres, page 43.

BB. Hind toe present and connected by web to inner toe; nostrils small or wanting. Order IV, Steganopodes, Totipalmate Swimmers, page 65.

BBB. Hind toe present; not connected with front toes.—E, EE.

E. Cutting edges of bill with teeth or comb-like ridges.—Order V, Anseres, Ducks, Geese and Swans, page 70.

EE. Cutting edges of bill without teeth or comb-like ridges.—F. FF, FFF.

F. Legs short, shank (tarsus) compressed like knife-blade; feet placed far back; no visible tail.—Families 2 and 3, Colymbidæ and Gaviidæ, Grebes and Loons, pages 36 and 40.

FF. Legs short, shank not noticeably compressed; legs midway in body; tail well developed.—Order II, Longipennes, Gulls and Terns, page 47.

FFF. Legs very long and slender, bill slender, recurved at tip.—Avocet, Family 25, Recurvirostridæ, page 169.

AA. Imperfectly or not at all web-footed.—G, GG.

G. Tibia more or less bare above heel ("knee").—H, HH.

H. Lores naked (sometimes part of head also).—I, II, III.

I. Bill straight and sharp, middle claw pectinate (with a comb).—Family 20, Ardeidæ, Herons, page 127.

II. Bill straight, not very sharp, middle claw not pectinate.—Family 21, Gruidæ, Cranes, page 148.

III. Bill decurved, not sharp; middle claw not pectinate.—Family 18, Ibididæ, Ibises, page 124.

HH. Lores, and rest of head, feathered or bristly.—J, JJ.

J. Large, length 3 feet or more.—Family 21, Gruidæ, Cranes (young), page 148.

JJ. Small, length less than 2 feet.—K, KK.

K. Legs very short; tarsus about one half as long as middle toe.—Family 45, Alcedinidæ, Kingfishers, page 341.

KK. Legs long, tarsus little if any shorter than middle toe.—L, LL.

L. Feet large and clumsy-looking, the middle toe equal to or longer than the tarsus.—Family 23, Rallidæ, Rails, page 152.

LL. Feet and legs slender, the middle toe barely equal to tarsus, often much shorter.—M, MM.

M. Tarsus scutellate in front (with a single row of transverse plates). (Fig 54).—N, NN.

N. Bill slender, weak, mostly longer than head.—O, OO.
    O. Toes with webbed margins or lobed flaps.—Family 24, Phalaropodidæ, Phalaropes, page 165.
    OO. Toes without marginal webs or lobes.—Family 26, Scolopacidæ, Snipe, etc., page 171.
NN. Bill stout, spike-like, about as long as head.—Turnstone and Red Phalarope, pages 217 and 165.
MM. Tarsus reticulate (Fig. 56).—P, PP.
    P. Bill long, very slender, more or less upcurved.—Family 25, Recurvirostridæ, Stilt, page 170.
    PP. Bill short, stout, straight.—Family 27, Charadriidæ, Plover, page 208.
GG. Tibia feathered down to heel joint ("knee").—Q. QQ.
  Q. Upper mandible with a cere, or with a soft swollen membrane (Fig. 64) at base.—R, RR.
    R. Bill strongly hooked.—S, SS.
      S. Plumage bright green or green and yellow.—Family 42, Psittacidæ, Paroquet. (Appendix.)
      SS. Plumage not green nor green and yellow.—Order XII, Raptores, Birds of Prey, page 254.
    RR. Bill not hooked.—Order XI, Columbæ, Doves and Pigeons, page 238.

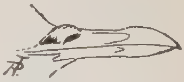

Fig. 64. Bill of Mourning Dove.

  QQ. Upper mandible without a cere, or soft swollen membrane at base.—T, TT.
    T. Only two toes in front.—U, UU.
      U. Tail long, of soft feathers.—Family 43, Cuculidæ, Cuckoos, page 337.
      UU. Tail medium, of stiff, pointed feathers.—Order XV, Pici, Woodpeckers, page 345.
    TT. Three toes in front.—V, VV.
      V. Nail of middle toe pectinate (with a comb on inner edge).—Family 47, Caprimulgidæ, Goatsuckers, page 373.
      VV. Nail of middle toe not pectinate.—W, WW.
        W. Each tail feather tipped with a spine.—Family 48, Micropodidæ, Swifts, page 381.
        WW. Tail feathers not spine-tipped.—X, XX.
          X. Very small birds, less than 4 inches long.—Family 49, Trochilidæ, Hummingbirds, page 387.
          XX. More than 4 inches long.—Y, YY.
            Y. Hind toe and claw not more than half as long as middle toe and claw.—Z, ZZ.
              Z. Bill much longer than head.—Woodcock (Family Scolopacidæ), page 172.
              ZZ. Bill shorter than head.—Order X, Gallinæ, Grouse, Partridges, etc., page 220.
            YY. Hind toe and claw much more than half as long as middle toe and claw.—Order XVII, Passeres, Perching Birds, page 389.

LIFE HISTORIES OF MICHIGAN BIRDS.—PART I. WATER BIRDS.

Order I. PYGOPODES.*—Diving Birds.

KEY TO FAMILIES.

A. Tail-feathers wanting; toes conspicuously lobed (Fig. 3) the nails of the anterior toes very broad and flat.—Family 1, Colymbidæ, Grebes, page 36.

AA. Tail-feathers present but short.—B, BB.

B. Toes four, hind toe present.—Family 2. Gaviidæ—Loons, page 40.

BB. Toes three, hind toe wanting.—Family 3, Alcidæ—Auks and Murres, page 43.

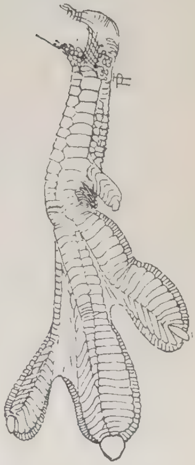

Fig. 3. Foot of Grebe.

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*The classification and nomenclature adopted are those of the third edition, 1910, of the Check-list of North American Birds prepared for the American Ornithologists' Union, and the number in parentheses *following* the scientific name is the species number used in the second edition of that check-list (1895). The number *preceding* each species name is the serial number of the present list. For an outline of the classification used those interested may consult Appendix No. 5 near the end of the volume.

Family 1. COLYMBIDÆ.—Grebes.

KEY TO SPECIES.

A. Wing more than 5 inches (and less than 9).—B, BB.
  B. Wing more than 7 inches.—C, CC.
    C. Culmen $2\frac{1}{2}$ inches or more.—Western Grebe. (Appendix.)
    CC. Culmen less than $2\frac{1}{2}$ inches.—Holboell's Grebe. No. 1.
  BB. Wing less than 6 inches.—D, DD.
    D. Bill compressed, deeper than wide at base.—Horned Grebe. No. 2.
    DD. Bill depressed, wider than deep at base.—Eared Grebe. (Appendix.)
AA. Wing 5 inches or less.—Pied-billed Grebe. No. 3.

1. Holboell's Grebe. Colymbus holboelli (*Reinh.*). (2)

Synonyms: Red-necked Grebe.—Podiceps holbellii, Reinh., 1853.—Podiceps greisegena of many authors.—Podiceps greisegena var. holboelli, Coues, 1872.

Largest of the so-called "Hell-divers," intermediate in size between the common Grebes and the Loon. To be identified positively only by exact measurements in comparison with detailed description.

Distribution.—North America at large, including Greenland, also eastern Siberia and southwest to Japan. Breeds in high latitudes, migrating south in winter.

This grebe has been taken in Michigan at widely separated places, but less than a dozen times in all so far as known. The following are the records known to us: One taken at Hillsdale, in the spring of 1890, by Prof. Frank Smith, now in museum of Hillsdale College; one in the collection of B. J. Savage, Monroe, an autumn specimen taken about 1901; one picked up frozen March 12, 1900, at Greenville, Montcalm county, mounted by the late Percy Selous and now in the museum of Agricultural College; one in collection of C. J. Davis, Lansing, taken at Pine Lake, Ingham county, in autumn, exact date not known (This is the specimen recorded in Cook's "Birds of Michigan" as the Western Grebe, *Æchmophorus occidentalis*); another taken at same place (Pine Lake) by T. L. Hankinson, October 30, 1897; one shot at Capac, St. Clair county, February 15, 1904 (Swales); one in high school collection at Sault Ste. Marie, collected there (1901?) by Stewart Ten Eyck; one mounted specimen in the Barron collection at Niles, without data; one said to have been taken at Mitchell's Bay, St. Clair Flats (Saunders). This Grebe is said to be a spring and fall visitor on the Detroit River, by McIlwraith; observed by Boies about Mud Lake on the east side of Neebish Island, St. Mary's River, in summer of 1893; said to be a rare migrant in Delta county (Van Winkle); and a common migrant in the fall at Ann Arbor (Covert).

The above records indicate practically all that we know of this species. It comes to us from the north in the autumn, some individuals doubtless remain on the unfrozen waters of the state through the winter, and it retires northward beyond our limits on the approach of warm weather; the records are too few to give us any idea of its actual migration movements. There is no reason to suppose that it nests anywhere in the state. At Leech Lake, Minn., where a small colony was found nesting in June, 1903, by Mr. E. S. Currier (Auk, Vol. XXI, pp. 31-32), the nests were on muskrat houses in deep water. Sets of 4, 5 and 7 eggs were found on June 10.

Its food doubtless consists, like that of all other members of the family, entirely of aquatic animals, mainly fish. The name "Red-necked Grebe" is not particularly appropriate to the bird as we see it, since the red neck belongs to the breeding season and specimens taken within our limits rarely show more than traces of the red throat.

There is no unquestionable record of the Western Grebe, Æchmophorus occidentalis, in Michigan. See Appendix.

TECHNICAL DESCRIPTION.

Adult in breeding plumage has top of head, back of neck and most of back black, deepest on head, duller on back. Sides of head, upper throat and belly, pure white. Front and sides of neck reddish brown (rufous). In winter the adult is brownish black above, white or grayish white below, and the red neck is paler and duller. Young birds are similar but have no reddish brown on the neck. Iris red. Sexes alike. Length 18 to 20 inches; wing, 7.25 to 8; culmen, 1.65 to 2.40.

2. Horned Grebe. Colymbus auritus *Linn.* (3)

Synonyms: Hell-diver, Water-witch.—Colymbus auritus, Linn., 1758, and of most authors.

One of the two small Hell-Divers which are common on our lakes and streams, and recognizable ordinarily by its slender, pointed, uniformly dark bill.

Distribution.—Northern Hemisphere. Breeds from the northern United States northward.

In Michigan the bird is universally distributed during spring and fall, and not infrequently spends the winter if suitable open water can be found. The question of its nesting within our limits apparently remains to be settled. It is by no means improbable that it nests in small numbers in the northern part of the state, but there is no unquestionable record. The older lists state positively that the species nested in abundance at St. Clair Flats and along the Detroit River, but no exact records are given and in recent years careful search has failed to show any nesting birds in those regions. McIlwraith states that it breeds "in all suitable places throughout Ontario, notably at St. Clair Flats." (Birds of Ontario p. 27). This, however, does not accord with recent experience and Mr. Wm. Saunders of Toronto states in a recent letter to Mr. B. H. Swales that he finds no evidence that the species has ever bred at St. Clair Flats. Undoubtedly single specimens of this bird occur in different parts of the state during summer, but these in all probability are barren birds or "pensioners," that is, birds wounded or partially disabled during the shooting season and not able to go north with the rest of their kind. It is not impossible that such individuals sometimes mate and nest, but such instances must be few. We saw a single adult on a small stream, the Sucker, at Grand Marais, Alger county, Michigan, on the south shore of Lake Superior, July 8, 1903, and the bird might well nest in that region if anywhere in the state. It reappears in numbers very early in autumn, by mid-August at least, and remains on the Detroit River at least through the first week in May. It is known to nest abundantly in the Hudson Bay region, as well as in northern Minnesota, North Dakota and Manitoba. It builds a somewhat bulky nest of more or less decomposed vegetable matter, grasses, rushes, etc., and although the nest is usually anchored to surrounding vegetation it not infrequently floats about more or less and is said to be sometimes attached in such a way that it can rise and sink as the level of the water changes.

It lays from three to five eggs, which are white, more or less stained by the fermenting herbage of the nest, and average 1.78 by 1.20 inches.

This grebe frequently avoids the sportsman's shot by diving at the flash of the gun, but is much less successful since nitro-powder came into general use. It also has the power, in common with other members of the family, of sinking slowly beneath the surface until only the head, or even the bill remains above, and it is able to remain entirely submerged for at least several minutes; exact determination of the length of time should be made by some one who has good opportunity for observation.

The food is mainly fish, but aquatic insects are frequently found in its stomach.

TECHNICAL DESCRIPTION.

The adult in breeding plumage has the top of the head, back of neck and the chin brownish black to sooty black, deepest on the crown; there is a prominent ruff or hood about the back of the head consisting of elongated feathers, about half buff or cinnamon, the remainder brownish black; the front and sides of the neck and the sides of the chest are chestnut, remainder of the lower parts silky white, back and rump slaty black. The secondaries are mostly white and very conspicuous in flight; there is no evident tail. Bill slender, black, tipped with yellow; iris red. Sexes alike. Winter plumage mainly grayish black above and pure white below with no trace of buff or chestnut and little indication of the hood or ruff. The slender bill and larger amount of white in the wings are the characters most readily separating it from the Pied-bill Grebe in the same plumage. Length, 12.50 to 15.25 inches; wing, 5.75.

3. Pied-billed Grebe. Podilymbus podiceps (*Linn.*). (6)

Synonyms: Dabchick, Dipper, Water-witch, Hell-diver, Die-dapper or Dive-dapper, Carolina Grebe.—Colymbus podiceps, Linn., 1758.—Podiceps carolinensis, Lath., 1790, and most of the earlier American writers.

Figures 1, 2, 3.

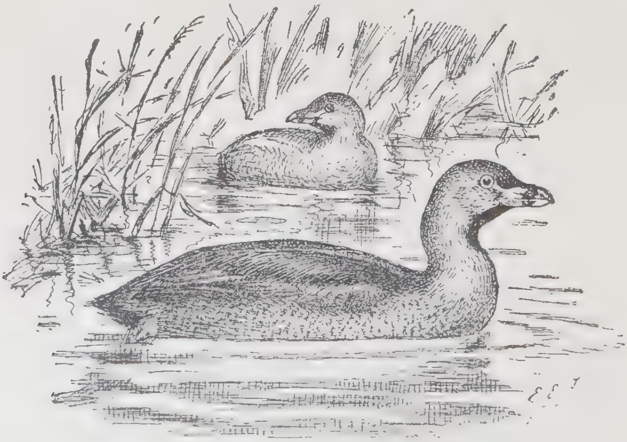

Fig. 1. Pied-billed Grebe.
From Nuttall's Ornithology (Chamberlain). Little, Brown & Co.

The most common of the divers and readily separated from the preceding species by its much thicker bill, which in summer is light colored, encircled by a black band, which however is lost in winter.

Distribution.—British Provinces southward to Brazil, Argentine Republic and Chili, including the West Indies and Bermuda; breeding nearly throughout its range.

In Michigan very generally distributed and absent only during the winter months. We have no record of the occurrence of this species in December, January or February, but it has been taken every other month in the year.

It nests abundantly in every suitable place in the state, from the Ohio-Indiana line to Lake Superior, building a floating nest similar to that of the Horned Grebe, and laying from five to eight white eggs which average 1.72 by 1.99 inches. We have sets of 5, 6 and 7 eggs taken on different lakes in Barry county, May 29, 1885, May 31, 1888, and June 4, 1888.

During the nesting season the birds keep more closely to the marshes and the rank vegetation along the borders of streams and ponds, where they are less likely to be seen. Sometimes many pairs will be found nesting in small and isolated marshes where their presence would hardly be suspected. No doubt the heat of the decaying vegetation of the nest aids materially in hatching the eggs, and the mother usually covers the eggs with some such material when leaving the nest voluntarily. The young take to the water immediately upon hatching, and when a nest with one or two stained eggs is found, search in the vicinity, or a little patient watching, will usually reveal three or four newly hatched young close by. This bird is seldom seen on the wing, since it seems always to prefer to escape by diving. It undoubtedly migrates by night, and one is recorded as killed on Spectacle Reef Light, Lake Huron, the night of September 9, 1904.

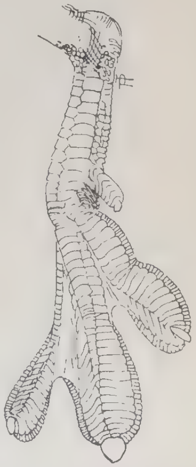

Fig. 3. Foot of Pied-billed Grebe. (Original.)

TECHNICAL DESCRIPTION.

The adult in breeding plumage has the chin and upper throat velvet black sharply defined from the clear gray of the front and sides of the neck; crown, nape and back of neck brownish black to clear black. Rest of upper parts brownish gray; under parts mixed silver white and gray more or less spotted with black on the chest. The bill is light colored with a conspicuous black band encircling it near the middle. The inner webs of the secondaries are largely white. Iris brown; sexes alike. In winter the bill is yellowish without any trace of the black band and the throat is whitish without trace of black. Rest of under parts are silky white or grayish white and the upper parts slaty black or brownish black. In this plumage the bird closely resembles the Horned Grebe of the same season; compare description under that species. Length, 12 to 15 inches; wing, 4.50 to 5.

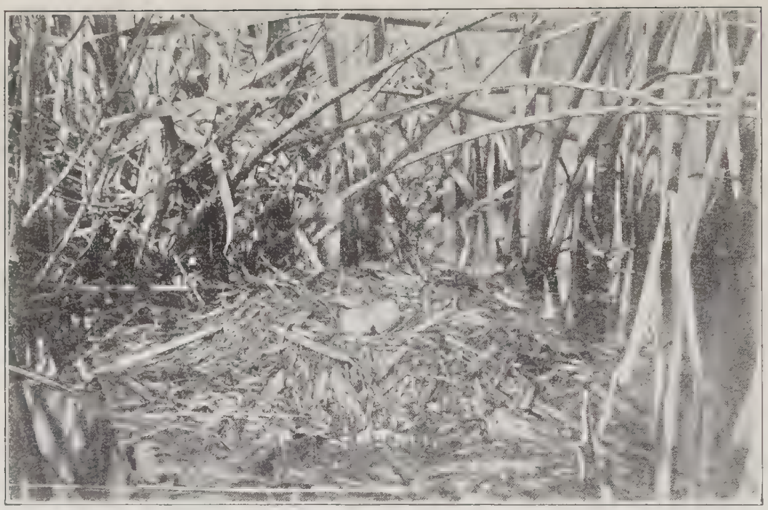

Fig. 2. Nest and Eggs of Pied-billed Grebe.
From photograph by Thos. L. Hankinson.

Family 2. GAVIIDÆ.—Loons.

KEY TO SPECIES.

A. Tarsus shorter than middle toe without claw.—B, BB.
  B. Depth of bill at base .90 inch or more.—Common Loon. No. 4.
  BB. Depth of bill at base .80 inch or less.—Black-throated Loon. (Appendix.)
AA. Tarsus longer than middle toe with claw.—Red-throated Loon. No. 5.

4. Loon. Gavia immer (*Brunn*). (7)

Synonyms: Great Northern Diver, Walloon, Ring-necked Loon, Black-billed Loon, Guinea Duck, Greenhead.—Colymbus immer, Brünnich, 1764.—Colymbus imber, Gunn., 1761.—Urinator imber, Stejn., 1885.—Colymbus torquatus and Colymbus glacialis of most of the older writers.

Figure 4.

Readily recognized by its large size, and, in summer, by its green head, checkered black and white back, and white under parts. Largest of our divers.

Distribution.—Northern part of Northern Hemisphere. In North America breeds from the northern tier of states northward; ranges in winter south to the Gulf of Mexico and lower California.

In Michigan most abundant during migration, but generally distributed, so that there is hardly a stream or pond on which Loons are not seen each season. Formerly it nested abundantly on most of the ponds and lakes of the state, even to the southernmost border, but of late years it is much less common in summer in the more thickly settled parts of the state, although it probably nests occasionally in every county. Toward the north it nests in undiminished numbers and during the migrations is so abundant in some places as to be a serious annoyance to the fishermen in whose nets it is often entangled and drowned. Mr. W. A. Oldfield of Port Sanilac, has sent us specimens of this species and the Horned Grebe taken in herring nets at that place; and the late Dr. J. W. Velie of St. Joseph told us that it was often caught in the nets there, particularly in the spring.

The nest is commonly a hollow in the top of a heap of matted water plants of various kinds, sometimes on the mainland, more often on small islands in inland lakes, most often of all on the top of a muskrat house at the edge of a pond or in some large flooded marsh.

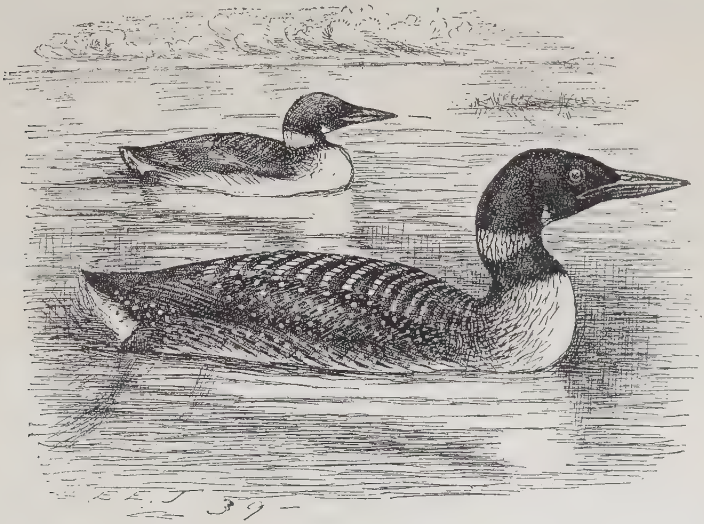

Fig. 4. Loon.
From Nuttall's Ornithology (Chamberlain). Little, Brown & Co.

The eggs are invariably two, olive-brown more or less spotted with darker brown and black. They average 3.52 by 2.27 inches. In the southern part of the state the eggs are often laid the first week in May, but eggs are also found as late as the last week in June. Dr. Dunham writes that in Kalkaska county he has taken the eggs as early as May 12.

The bird feeds entirely on fish, dives at the flash of the gun, and after it has been shot at a few times becomes extremely wary and makes long trips under water often putting only the bill above the surface in order to breath.

It is said to carry its young on its back during flight from one pond to another, or from the nesting pond to the open lake, but this statement needs confirmation. Dr. Gibbs states that he has seen the old one carrying the young on its back when swimming in the lake.

The call of the Loon is loud but not unmusical; as commonly heard, however, at night and often in stormy weather, it has something peculiarly weird and uncanny about it.

TECHNICAL DESCRIPTION.

Largest of our divers, from 2½ to 3 feet long, but with rather small wings measuring about 4½ feet from tip to tip. Bill from 3 to 4 inches long, straight, sharp pointed and black. Feet webbed, the shanks (tarsi) compressed to a knife edge, and the toes and nails flattened to make the most effective paddle among birds. To increase their efficiency the legs are placed far back, almost at the root of the tail. The plumage is thick, silky, compact and ducklike. Adults in summer have the head and neck greenish or purplish black with a crescent-like white patch on the upper throat in front and a similar white patch forming a collar lower down which nearly or quite encircles the neck behind but does not quite meet in front. Both these white patches are streaked with black. Sides of breast streaked with black and white; back and upper surface of wings glossy black, thickly and sharply checked and spotted with white, the spots largest and squarest in the middle of the back, smaller and rounder in front and behind. Eyes red. The male is considerably larger than the female, but the sexes are alike in color. In winter both are plain brownish black or dark brown above, darkest on back of neck and top of head, and grayer on the back; below they are pure white from bill to tail, the lines between the upper and under parts not being very sharp but more or less gray or brown intervening. The downy young are plain brown or gray above and white below. Length, 28 to 36 inches; wing, 13 to 15.25; culmen, 2.75 to 3.50.

5. Red-throated Loon. Gavia stellata (*Pontop.*). (11)

Synonyms: Red-throated Diver.—Colymbus stellatus, Pontoppidan, 1763.—Colymbus lumme, Gunn., 1761.—Urinator lumme, Stejn., 1882, A. O. U. Checklist, 1895.—Colymbus septentrionalis of most authors.

Likely to be taken for the young of the common Loon, or even for the adult Loon in winter plumage, although it is decidedly smaller. Can hardly be identified except with the bird in the hand.

Distribution.—Northern part of Northern Hemisphere, migrating southward in winter nearly across the United States.

In Michigan found only in winter, or at least from late fall until spring; and it seems to be much more frequently seen in spring than in fall. It frequents the Great Lakes and the larger ponds and streams, but is very much less often seen than the common Loon. Ordinarily it is in the winter plumage and there is no indication of the red throat, but occasionally some of the birds obtain their adult plumage, or something approaching it, before going north in the spring. The late Dr. J. W. Velie, of St. Joseph, wrote: "Eight or ten specimens were brought in by fishermen in May, 1904, taken from nets set in shallow water off shore at this place. Five or six of these were brought in on the same day and among them were two specimens in almost perfect breeding plumage with the red throat fully colored. Although this species is common here every spring, this is the first time I have ever found it with the red throat."

There is no reason to suppose that this diver ever nests in Michigan. Its normal nesting grounds are in the far north, and its eggs closely resemble those of the common Loon, but are much smaller, averaging 2.82 by 1.76 inches.

TECHNICAL DESCRIPTION.

Similar to the preceding species; but decidedly smaller. Adult in summer (never seen in Michigan) with the entire upper parts dark brownish black or slaty black, thickly marked with small, oval white spots; the back of the neck black streaked with white. Front of neck with a large triangular patch of rich chestnut; rest of under parts white. The winter plumage is similar, but the dark upper parts are duller, the red throat-patch mostly or entirely wanting, and the throat, breast and belly white. The wings and back often show traces of the oval white spots, and this, with the smaller size, serves to separate it readily from the common Loon in winter plumage.

Measurements: Length, 24 to 27 inches; wing, 10 to 11.50; culmen, 2.00 to 2.25; tarsus, 2.75.

Family 3. ALCIDÆ.—Auks and Murres.

KEY TO SPECIES.

A. Wing more than 7 inches.—B, BB.
  B. Gonys less than 1 inch (av. .83).—Brünnich's Murre. No. 6.
  BB. Gonys more than 1 inch (av. 1.14).—Common Murre (Appendix).
AA. Wing less than 6 inches.—Little Auk. No. 7.

6. Brunnich's Murre. Uria lomvia lomvia (*Linn.*). (31)

Synonyms: Thick-billed Murre, Thick-billed Guillemot, Brünnich's Guillemot.—Alca lomvia, Linn., 1758.—Uria lomvia, Bryant, 1861, A. O. U. Checklist, 1895.

Plate II.

A sea-bird of odd appearance with short legs, webbed feet with only three toes, and thick, soft, duck-like plumage, slate above and white below.

Distribution.—Coasts and islands of north Atlantic and eastern Arctic Oceans; south (in winter) to the lakes of northern New York and the coast of New Jersey. Breeding from the Gulf of St. Lawrence northward.

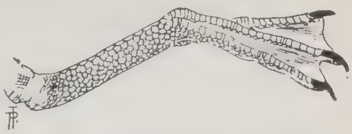

Fig. 5. Foot of Brunnich's Murre. (Original.)

This straggler from the north was first recorded from Michigan by the writer (Auk, XII, 387, Oct., 1895), the occasion being the capture of a specimen in a dying condition at Greenville, Montcalm county, December 13, 1894. The specimen was brought alive to the late Percy Selous, who made a water-color sketch of the bird and sent it to us for identification. Subsequently Mr. Selous presented the nicely mounted specimen to the Agricultural College, and it is now in our museum. Specimens are frequently taken in the fall and winter along the Atlantic coast as far south as New York, and they have been recorded occasionally from inland lakes many miles from salt water. They occurred in large numbers at Quebec, Canada, from November 15, 1893, to January 8, 1894, (Auk, Vol. XI, 175), but the above specimen, so far as known, is the first to be recorded from any part of the Great Lake region. No other specimen was taken during the winter of 1894-95 so far as we can learn, but in December, 1896, a remarkable flight of these birds occurred on lakes Ontario and Erie, and many specimens were taken in Michigan, Ohio, Indiana and Ontario. Probably a score or more were taken in Michigan waters, but the following are the only ones of which we have record: One taken on Detroit River December 19, 1896, now in the high school collection at Sault Ste. Marie; one adult male shot from a flock near Gibralter, Wayne county, Michigan, December 26, 1896, originally recorded as *Uria troile* (Bull. M. O. C. I., p. 10); this specimen now in the museum of the University of Michigan, Ann Arbor; two specimens killed at St. Clair Flats, and first recorded by W. A. Davidson as "Black Guillemots" (Bull. M. O. C. I., p. 8 and Ibid. I, 24); in addition to these Mr. Swales states that there are mounted birds at Ecorse and Trenton, Michigan, taken in December, 1896. He also states that during this flight "Some ten or twelve birds were taken on the Detroit River." Mr. Purdy, of Plymouth, Michigan, says that one was taken alive at Walled Lake, Oakland County, by some fishermen and given to William Stark of Northville, who kept it alive in his store where he (Mr. Purdy) saw and identified it. The bird afterward died and was thrown away. A similar invasion occurred in Dec., 1907, and numerous specimens were taken about Lake St. Clair and in the vicinity of Detroit between Dec. 1st and 10th.

The causes for the southward migration of these sea-birds, and especially for their appearance so far inland are entirely unknown. Mr. James H. Fleming of Toronto has been collecting data in regard to the "Great Flight" of 1895-96, and I am informed through Mr. P. A. Taverner that so far as known the stomach of every bird captured was entirely empty and the birds were all much emaciated and enfeebled, so much so that many of the specimens were readily captured by hand. In the vicinity of Toronto scores, perhaps hundreds, were found and there is reason to believe that the birds came south from the Arctic regions by thousands and that they could not, or at least did not, find suitable food to keep them alive.

This bird breeds on the Magdalene Islands, Gulf of St. Lawrence and northward, laying a single heavily spotted egg on the bare rock of the cliff. The eggs average 3.21 by 2.01 inches.

TECHNICAL DESCRIPTION.

In winter upper parts dusky or slate-colored, the secondaries alone tipped with white. Below, pure white from chin to tail, including most of the sides of the head and neck, but in young birds the white throat is more or less washed with dusky. A distinct groove or furrow in the plumage behind the eye. Length, 14.50 to 18.50; wing, 7.45 to 8.80 inches; culmen, 1.40 to 1.50; tarsus, 1.40 to 1.55.

7. Little Auk. Alle alle (*Linn.*). (34)

Synonyms: Dovekie, Sea-dove.—Alca alle, Linn., 1758.—Alle alle, Stejn., 1885, and most subsequent authors.

Smallest of the family and resembling a miniature of Brünnich's Murre, but of decidedly smaller size and proportionately smaller bill.

Distribution.—Coasts and islands of the northern Atlantic and eastern Arctic oceans; in North America south in winter to New Jersey; breeds in high northern latitudes.

This is an Arctic species confined as a rule to the sea and found inland as a rule only when driven there by severe storms. There seems to be but one record for Michigan, that by the late W. H. Collins of Detroit, whose record (O. & O. Vol. VII, p. 111, 1882) is as follows. "I received a fine specimen of the sea dove killed here on Detroit River by one of our market hunters. It was swimming among his decoy ducks. It proved to be a young female." In corroboration of this record Mr. Covert writes me that he saw the specimen and received the full history of its capture from Mr. Collins, and has no reason to doubt the record. The specimen itself may possibly be in existence still, but we have not been able to locate it.

The species migrates southward along the Atlantic coast with some regularity every winter and specimens are often taken along the coast of Maine and Massachusetts, not infrequently in fresh water ponds ten to fifty miles from the seashore. There is a record also of a specimen taken on Lake Ontario two miles from Toronto on November 18, 1901 (Auk, Vol. XIX, p. 94).

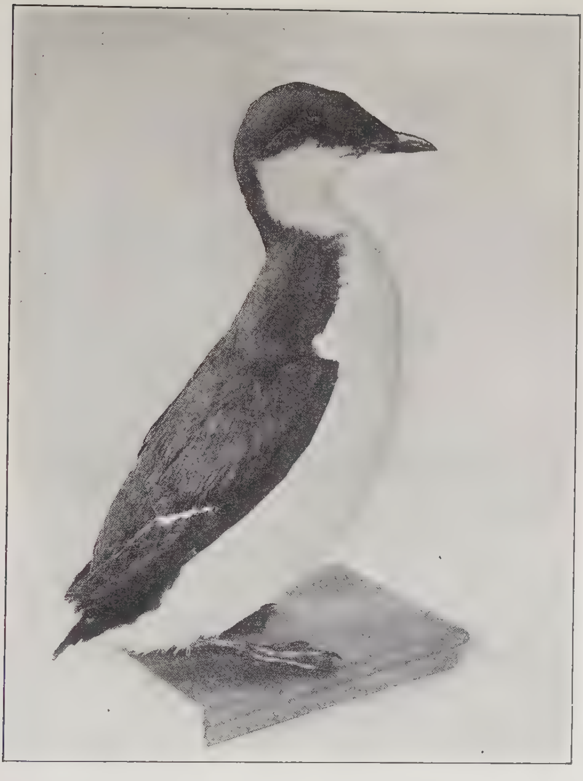

Plate II. Brunnich's Murre.
From photograph of mounted specimen.

This species nests only in high latitudes, mainly or entirely within the Arctic Circle, and its eggs are laid singly on islands and often on the bare rocks of cliffs overhanging the sea. The eggs average 1.90 by 1.29 inches, and are greenish white in color.

TECHNICAL DESCRIPTION.

The adult in summer has the head and neck all around, together with upper parts, blue-black, more glossy above, duller and more brownish on the throat, chest and sides of head. Scapulars white-edged and secondaries tipped with white. Under parts, except throat and chest, pure white. In winter the brownish black disappears from the throat and neck leaving the entire under parts pure white, and this color often extends over the sides of the head and along the sides of the neck until it nearly meets on the back of neck. Length, 7.25 to 9.15 inches; wing, 4.50 to 4.75; culmen, .50.

Order II. LONGIPENNES.—Long-winged Swimmers.

KEY TO FAMILIES.

A. Covering of upper mandible of three distinct pieces, hook, side-piece, and cere-like piece; two middle tail feathers projecting beyond the rest.—Family 4, Stercorariidæ.—Skuas and Jægers (Gull-chasers), page 47.

AA. Covering of upper mandible of a single piece; middle tail-feathers not projecting beyond the rest.—Family 5, Laridæ Gulls and Terns, page 49.

Family 4. STERCORARIIDÆ.—Gull-chasers.

KEY TO SPECIES.

A. Projecting middle tail-feathers broad at tip.—Pomarine Jæger. No. 8.
AA. Projecting middle tail-feathers narrow at tip.—Parasitic Jæger. No. 9.

8. Pomarine Jæger. Stercorarius pomarinus (*Temm.*). (36)

Synonyms: Jæger Gull, Gull-chaser, Gull-hunter.—Larus pomarinus and Lestris pomarinus, Temm., 1815.—Stercorarius pomarinus of most recent authors.

Most likely to be recognized, if at all, through its habit of chasing other sea-birds, somewhat in the manner of a hawk, although it seldom kills the bird it pursues, being content usually to compel it to drop or disgorge the prey which it has just captured.

Distribution.—Seas and inland waters of northern portions of the Northern Hemisphere; south in winter to Africa, Australia and probably South America.

This is another sea-bird of wide distribution, but unlike the Auks it is by no means restricted to salt water. Nevertheless it is seldom seen and still more seldom captured on the Great Lakes. The only record for Michigan which we have been able to verify is that of a specimen taken on the Detroit River May 30, 1879, by R. Saulier, and recorded by the late W. H. Collins in the Oologist for 1879, p. 24. This specimen is now in the Museum of Comparative Zoology, Cambridge, Mass., and bears the following label:

"Female. Detroit River, May 30, 1879. Killed by R. Sanlier. It was chasing Black Terns near Fighting Island."

The name appears in several lists of birds of the state, and there can be little doubt that the species occurs with some regularity on Lakes Superior, Michigan and Huron. Mr. E. W. Nelson states that he is "certain that this species is a rare visitant to Lake Michigan during severe winters" (Bull. Nutt. Orn. Club, Vol. I, p. 41). Dr. Brayton (Trans. Ind. Hort. Soc. 1879 p. 150) says "A rare winter visitant to Lake Michigan. October 9, 1876, in company with my friend Mr. E. W. Nelson * * * we saw a fine specimen of this bird flying along the lake shore near the state (Indiana) line." As already stated the bird preys upon other birds, robbing their nests of eggs and young or chasing the old birds and compelling them to give up the food they have taken.

The above record for Detroit River, May 30, shows that the bird lingers late in these latitudes, but it nests invariably far north, and its nesting habits are but imperfectly known. It lays two or three olive green to olive brown eggs more or less spotted with darker brown and black. The eggs average 2.35 by 1.63 inches.

TECHNICAL DESCRIPTION.

A web-footed, gull-like seabird, with bill more strongly hooked than in the ordinary gulls) and with the two middle tail-feathers projecting beyond the rest. These two feathers are nearly as broad as the rest, rounded at tip, and from 7 to 10 inches long. The adult often has the upper parts, except the nape, dark slate, and this color extends over the sides of the head. All the lower parts from bill to tail are white or yellowish white, and this is also the color of the nape. Some adults, however, are almost entirely slate-colored above and below, often appearing dull black; the greater number are intermediate between these two extremes. Immature birds are similar to adults, but are always thickly barred with dark brown below and rusty or yellowish white above. Length, 20 to 23 inches; wing, 13.50 to 14; culmen, 1.45 to 1.75.

9. Parasitic Jæger. Stercorarius parasiticus (*Linn.*). (37)

Synonyms: Richardson's Jæger; Teaser; Boatswain; Marlinspike.—Larus parasiticus, Linn., 1758.—Lestris parasitica, Ill., 1811.—Lestris richardsoni, Nutt., 1834, Aud., 1835. —Stercorarius parasiticus of most recent authors.

This bird is very similar to the Pomarine Jæger in general appearance but is smaller and has the two middle tail-feathers narrow and pointed, as well as elongated, which is readily seen when the bird is in full chase after a gull or tern which is dodging and twisting in the attempt to escape.

Distribution.—Northern part of the Northern Hemisphere, southward to North Africa and South America. Breeds in high northern districts, and winters from New York and California southward to Brazil.

Like the preceding species this a decidedly uncommon bird in Michigan. While it probably occurs regularly in spring and fall we know of but two unquestionable records. A specimen was killed at Otter Lake, Lapeer county, Sept. 28, 1897, and mounted by Robert P. Stark of that place, from whom it was obtained for the museum of the Agricultural College, where it now is. This is an immature bird, probably a bird of the year, and the sex was not determined. Another specimen was taken at Point Mouville, Detroit River, Nov. 27, 1903. It was found by Mr. Covert at a taxidermist's shop in Detroit, and identified by himself and Mr. B. H. Swales. It is now in the collection of the Detroit Museum of Art (Bull. Mich. Orn.

Club, Vol. IV, 1903, p. 94). Dr. Gibbs informs us that W. H. Collins of Detroit in a letter which he has, says "Two specimens taken on Detroit River, fall of 1876, and now in collection of Dr. Jasper, Columbus, Ohio. One taken in October, 1883, in dark plumage."

We have recently (Nov. 2, 1905) examined a nice specimen of this species in the Barron collection at Niles. It is an immature bird in a plumage intermediate between the light and dark phase and the middle tail-feathers but an inch longer than the rest. Although without any label it was probably taken in that vicinity.

In habits this bird does not differ much from the preceding, but is decidedly more common on the Atlantic coast, and is probably more a bird of the coast than of the open sea. It nests far north of our limits, laying eggs similar to those of the Pomarine Jaeger and averaging 2.30 by 1.64 inches.

TECHNICAL DESCRIPTION.

Adult: Most of the head, neck and under parts white or yellowish white, the top of head and the lores brown; the rest of the upper parts dark slate. Occasionally an adult is found which is brownish black or very dark slate all over. Young birds (full grown) are mostly brownish, variously streaked and barred with whitish or buff, the streaking most noticeable on head and neck, the barring on back, breast and belly.

Length, 15.50 to 21 inches; wing, 11.80 to 13.50; longest tail-feathers 4.90 to 6.25; culmen, 1.15 to 1.40.

Family 5. LARIDÆ.—Gulls and Terns.

KEY TO SPECIES.

- A. Outer tail-feathers longest (tail more or less forked).—C, CC, CCC.
  - C. Large; wing more than 13 inches.—D, DD.
    - D. Largest; bill thick; tail forked less than two inches, hind head not crested.—Caspian Tern. No. 19.
    - DD. Smaller; bill more slender; tail forked 3 inches or more; hind head crested.—Royal Tern. No. 20.
  - CC. Medium; wing 9 to 12 inches.—E, EE.
    - E. Outer tail-feathers much narrowed at tip.—F, FF, FFF.
      - F. Outer web of outer tail-feather darker than inner web.—G, GG.
        - G. Bill red with black tip (in summer).—Common Tern. No. 22.
        - GG. Bill all red (in summer).—Arctic Tern. No. 23.
      - FF. Inner web of outer tail-feather darker than outer web; bill red, black-tipped.—Forster's Tern. No. 21.
      - FFF. Both webs of outer tail-feather white; breast white or rose-tinted.—Roseate Tern. (Appendix.)
    - EE. Outer tail-feathers not narrowed at tip. Sabine's Gull. No. 18.
  - CCC. Small; wing less than 9 inches.—H, HH.
    - H. Back and upper surface of wings and tail slate-color or dark gray; bill black.—Black Tern. No. 25.
    - HH. Back and upper surface of wings pale pearl-gray; bill yellow, black-tipped.—Least Tern. No. 24.

AA. Tail feathers all of equal length (tail square or slightly rounded).—I, II.

I. Large; wing more than 13 inches.—J, JJ.

J. Primaries wholly white, or pale gray with white tips.—K, KK.

K. Wing over 16½ inches; tail over 7 inches.—Glaucous Gull. No. 11.

KK. Wing not over 16½ inches; tail less than 7 inches.—Iceland Gull. No. 12.

JJ. Primaries wholly dark, or boldly marked with black and white. —L, LL.

L. Back ("mantle") dark slate; wing over 17½ inches.—Black-backed Gull. No. 13.

LL. Back ("mantle") pale pearl-gray.—M, MM.

M. Wing more than 16 inches.—Herring Gull. No. 14.

MM. Wing less than 16 inches.—Ring-billed Gull. No. 15.

II. Small; wing not more than 13 inches.—N, NN.

N. Hind toe rudimentary or wanting.—Kittiwake. No. 10.

NN. Hind toe perfect but small.—O, OO.

O. Mantle dark (deep plumbeous or slate color).—P, PP.

P. Wing 12 to 13 inches.—Laughing Gull. (Appendix.)

PP. Wing 11 to 12 inches.—Franklin's Gull. No. 16.

OO. Mantle light (pale pearl gray) wing 10 to 11 inches.—Bonaparte's Gull. No. 17.

10. Kittiwake. Rissa tridactyla tridactyla (*Linn.*). (40)

Synonyms: Common Kittiwake.—Larus tridactylus, Linn., 1758.—Rissa tridactyla, A. O. U. Check-list, 1895, and most authors.

A rather small gull readily recognizable by the absence or extremely rudimentary condition of the hind toe, which never bears a nail and is usually altogether lacking. In addition the bird has brown or black feet and a pale yellow or greenish yellow bill and the outer four primaries have the tips entirely black.

Distribution.—Arctic regions, south in eastern North America, in winter to the Great Lakes and the middle states.

Although the Kittiwake has been included in several of the earlier lists of Michigan birds, there has always been some doubt as to its right to the place. Doubtless the similarity of this bird, particularly when immature, to the young of Bonaparte's Gull is responsible for many of the so-called "records." The Kittiwake is essentially a coast species, and although it occurs regularly along the St. Lawrence, on Lake Ontario, and even on the Niagara River, it certainly is of infrequent occurrence to the west of this point. We have but two records which are at all satisfactory, the first by Mr. Stewart E. White, who states that it is rare on Mackinac Island, but that a few accompany the large gulls in their migrations (Auk, Vol. X, 1893, p. 222); the other by Major A. H. Boies, who says "Occasionally seen about Mud Lake (St. Mary's River) in the fall of 1893-94" (Birds of Neebish Island, Bull. Mich. Orn. Club, Vol. I, p. 18). We have in the college museum a specimen of the Kittiwake (No. 8293) which came to us with Major Boies' collection, and which he says was surely killed on or near Neebish Island, but he is unable to give any additional data.

Stockwell says: "Frequent in winter on Lake Huron and common around the Straits of Mackinac" (Forest & Stream, Vol. VIII, p. 38). This is at variance with the experience of recent collectors. The record by Covert of a specimen taken at Ann Arbor April 9, 1875 (Forest & Stream, Vol. VII, p. 164) seems doubtful, the specimen not having been located. According to McIlwraith, this species is very common at the approach of winter, around the west end of Lake Ontario (Birds of Ontario, 1894, p. 43), and J. H. Fleming records the capture of several about Toronto, Ont., in November, 1899 (Auk, Vol. 17, 1900, p. 177). It is not included in Kumlien & Hollister's List of the Birds of Wisconsin, since not one unquestionable record for that state can be found.

In its habits it does not differ much from Bonaparte's Gull, except that as already noted, it seems partial to salt water, and it appears invariably to select rocky islands or cliffs for nesting purposes. It breeds abundantly on some of the rocky islands in the Gulf of St. Lawrence and northward, building a somewhat bulky nest of sea weeds, grasses and similar material and laying 3 to 5 eggs which are greenish, grayish or brownish white, spotted with brown and gray and average 2.26 by 1.61 inches.

TECHNICAL DESCRIPTION.

A medium-sized, nearly white gull, with three toes on each foot (all other gulls have four), and with the tail slightly emarginate or cut out. The adult in summer is pure white except that the mantle is bluish-gray and the ends of the four outer wing feathers are jet black, the outer feather having most black and the inner least. The fifth feather is white at tip, then black for a space, then white again; the remaining primaries white. Legs and feet brownish black, bill pale yellow or greenish yellow. In winter the old birds are similar but have the back of the head and neck gray instead of white. Young birds are like winter adults but with an additional black patch across the back of the neck, and the tip of tail usually with a black band. Length 16 to 16.70 inches; wing about 12.25; culmen 1.40 to 1.50.

11. Glaucous Gull. Larus hyperboreus *Gunn.* (42)

Synonyms: Burgomaster, Ice Gull.—Larus hyperboreus, Gunnerus, 1767.—Larus glaucus, Brunn., 1764, and most authors.

Not to be discriminated with certainty from the Herring Gull under ordinary circumstances; but larger and without any black on the primaries.

Distribution.—Arctic regions; south in winter in North America to the Great Lakes and Long Island.

This, one of the two largest gulls occurring on the Great Lakes, is by no means common and is rarely taken. In fact, although it undoubtedly occurs regularly during the colder half of the year, we have been unable to find a Michigan specimen in any collection, or even an unimpeachable record. Covert in his manuscript list states that there have been several authentic captures, but does not give any data. Kumlien & Hollister (Birds of Wisconsin, p. 9) state that there are in the Milwaukee Public Museum three specimens procured there January 8, 12, and 14, 1895. In Butler's "Birds of Indiana," 1897, p. 570 it is stated that "Mr. J. W. Byrkit informs me of its occurrence near Michigan City [close to the Michigan line.] Mr. F. M. Woodruff has a beautiful specimen in whitepl umage that he killed at Millers, Ind., Oct. 8, 1897." If the last statement is correct it proves that the species does not wait for cold weather before coming south, and presumably may be looked for on the Great Lakes at any time except during the actual nesting season. It nests in Iceland, Greenland, and Arctic America, generally laying two heavily spotted eggs which average 3.13 by 2.14 inches.

In its habits it resembles the Herring Gull closely, but is said to be more domineering and rapacious, often eating the young of other sea-birds and sometimes even attacking sitting birds and killing and devouring them.

TECHNICAL DESCRIPTION.

One of the largest gulls found within our limits. The tail always even, that is, neither rounded nor forked, the head always white in the summer adult. Primaries pale pearl-gray, becoming pure white at tip. Mantle pale pearl-gray. Some specimens are pure white all over. In winter the adult is very similar, but the head and back of neck are marked with more or less light brownish. Immature birds as large as the adults never have the pure white plumage, but are more or less mottled with reddish-brown, sometimes almost uniformly dark brown below, and the mantle also dark brown, The bird can usually be told in any plumage by its size and the absence of any clear black in any part of the plumage.

Length, 26 to 32 inches; wing, 16.75 to 18.75; tail, 7.40 to 8.50; culmen, 2.30 to 2.70.

12. Iceland Gull. Larus leucopterus *Faber.* (43)

Synonyms: White-winged Gull.—Larus leucopterus of most authors.

Not distinguishable from the preceding species except by careful measurement.

Distribution.—Arctic regions, south in winter to Massachusetts and the Great Lakes, occasionally much farther south.

This bird is precisely like the Glaucous Gull in plumage, habits, and distribution, differing only in size, the present species averaging decidedly smaller than the Glaucous Gull. Its nesting habits and eggs are also similar, except that the eggs are smaller, averaging 2.79 by 1.89 inches. The impression seems to prevail that this bird is less rare than the Glaucous Gull on the Great Lakes, and several authorities state this as a fact. Kumlien and Hollister (Birds of Wisconsin, 1903) call it a regular winter visitant on Lake Michigan, but by no means common, although occurring more frequently than the Glaucous. Nelson (Bull. N. O. C. Vol. I, p. 41) says "A regular winter visitant on Lake Michigan." Dr. Brayton also says it is a "not uncommon winter resident on Lake Michigan." The only absolute record which we have is that of a specimen collected at Sault Ste. Marie, Mich. in 1901, by Mr. John Graham, and now in the High School collection at that place. A photograph and measurements furnished by Mr. W. P. Melville confirm this identification.

TECHNICAL DESCRIPTION.

Almost exactly like the Glaucous Gull in everything but size; the bill, however, is not as heavy, and particularly not as deep. Its average depth at the deepest part being only about .62 of an inch, while that of the Glaucous Gull at the same point is from .80 to 1.00 inch. Length, 24 to 26 inches; wing, 14.75 to 16.50; tail, 6.00 to 6.70; culmen, 1.60 to 1.70.

13. Black-backed Gull. Larus marinus *Linn.* (47)

Synonyms: Great Black-backed Gull, Saddle-back, Coffin-carrier.—Larus marinus of most authors.—Larus maximus, Leach.

Largest of our gulls, or at least one of the two largest, the adult always recognizable by the black back which gives it the name; the immature bird, however, may be confounded easily with the young of the other species and can be identified only by the expert.

Distribution.—The coasts of the North Atlantic; south in winter to Long Island and Italy.

A rare bird in Michigan waters, but undoubtedly occurs once in a while, although captures must be very rare. "One was shot on the Detroit River in March, 1904, and mounted by C. Campion of Detroit" (B. H. Swales, MS. List of Birds of S. E. Michigan, 1904). Specimens have been recorded from Wisconsin, Illinois and Indiana; and it has been reported in Michigan waters by several good observers. S. E. White reports seeing it at Grand Rapids, March 28, 1890, and calls it a very rare migrant at Mackinac Island. Covert reports it at St. Clair Flats April 9, 1875; and the late Dr. J. W. Velie informed us that he had taken it personally at Chicago, Ill., and had seen it at St. Joseph, Berrien county, Mich., "several times in winter and spring within the past ten years. There is no possibility of mistaking the species when seen near at hand." While within our limits its habits are like those of the other large gulls, although it is said to be more wary than any other species.

It nests in the far north and its eggs are similar to those of the Glaucous Gull, and average 3.05 by 2.12 inches.

TECHNICAL DESCRIPTION.

Mantle dark slate; primaries mostly black with white tips or white spots near the tips; rest of the bird pure white. This is the adult in summer plumage. In winter the adult is quite similar, but the head and neck are more or less streaked with dusky brown. The immature bird, as large as the adult, is usually not dark colored all over, sometimes dark brown mottled with rusty or whitish, sometimes much lighter beneath and with the throat nearly unspotted. The primaries and tail are blackish-brown, the primaries tipped with white and the tail with a whitish bar near the end.

Length, 28 to 31 inches; wing, 17.60 to 19.50; culmen, 2.40 to 2.60.

14. Herring Gull, Larus argentatus *Pont.* (51)

Synonyms: Common Gull, Harbor Gull, Sea Gull, Lake Gull.—Larus argentatus of most authors until 1862.—Larus smithsonianus, Coues, 1862.—Larus argentatus var. smithsonianus, Coues, 1874, and most subsequent authors.

Known commonly by its large size, white plumage with pearl gray mantle, and wing tips largely black.

Distribution.—Northern Hemisphere, south in winter to the Azores, Cuba, and lower California; breeding from Maine, northern New York, the Great Lakes and Minnesota northward.

Commonest of the large gulls and the one usually seen about lake ports and harbors everywhere during the colder half of the year. Formerly it nested abundantly at many places on Lake Michigan and Lake Huron, but has been driven from most of its southern nesting grounds and is now restricted to a few favorable localities in the northern parts of these lakes and along the shores and islands of Lake Superior. It builds a bulky nest of grasses, weeds, twigs, and other rubbish, often lined with moss, and lays three or four heavily spotted eggs which average 2.85 by 2.01 inches. Its favorite nesting place is some small island remote from the mainland or more or less inaccessible for one reason or another. In regions where it has been much persecuted it has been known to place its nests on the branches or tops of ever-green trees, but we have never known them to be so placed in the Great Lake region. The young leave the nest within a few days after they are hatched, but very likely return to the nest at night. They take to the water long before they can fly, and although they swim beautifully make no attempt to dive.

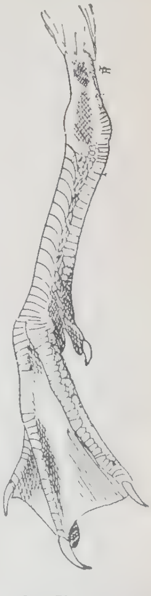

Fig. 6. Foot of Herring Gull, reduced. (Original.)

The first eggs are laid early in June, but often the nests are robbed continuously so that fresh eggs are often found until late in July. Probably not all the individuals nest during the first year and this may account for the numbers of dark colored birds which linger about the shores and harbors far south of any known nesting places. The regular southward migration begins by the middle of August, and although the greater number spend the winter farther south, many remain all winter in the open water of the southern parts of the lakes. Indeed probably a few linger all winter wherever there is open water, at least as far north as the Straits of Mackinac and the rapids of the Sault Ste. Marie. During migration the birds frequently visit inland lakes and streams and probably there is not a county in the state where they do not appear occasionally wheeling slowly over ponds and streams in search of fish or other food.

Formerly the eggs were collected in large numbers by the Indians and fishermen, and were commonly sold for food in the markets of Escanaba and some other large lake ports. Mr. Ed. VanWinkle, Van's Harbor, Mich., states that it still (1905) "Breeds abundantly on middle and south Gull Islands as well as on Gravel Gull Island at the entrance to Green Bay in Delta county, Mich. It is no uncommon thing for the egg poachers on some of their trips to carry away 2,000 to 3,000 of their eggs." It is hoped that this is altogether a thing of the past. The present law protects all gulls, as non-game birds, and a heavy penalty may be imposed for killing them or disturbing their nests or eggs.

TECHNICAL DESCRIPTION.

Adult in summer with the head wholly white and the tail even. Mantle delicate pearl-gray; primaries black and white, usually white-tipped with a black sub-terminal space. Lower mandible often with a red or yellow spot but never with a black one. Winter plumage similar, but the head and neck streaked with brownish or gray. Immature very variously marked, sometimes almost uniform chocolate brown all over, sometimes mottled with brown, white and pearl-gray in variable amounts. A black tail-bar frequently occurs, but other specimens lack it altogether. Length, 22.50 to 26.00 inches; wing, 16.25 to 17.50, culmen 1.95 to 2.50.

15. Ring-billed Gull. Larus delawarensis *Ord.* (54)

Synonyms: Common Gull, Lake Gull (confused with the Herring Gull).—Larus delawarensis, Ord, 1815, and many others.—Larus zonorhynchus, Rich., 1831, Nutt., 1834, Aud., 1835, and a few others.

In full plumage this bird may be distinguished from any other gull of our waters by its yellowish bill with a distinct band of black encircling it. In any other plumage, however, it is so similar to several others species, particularly to the Herring Gull, that it is not likely to be recognized except by the expert. It is decidedly smaller than the Herring Gull, but unless the two are seen in company this fact is not apparent.

Distribution. North America at large; south in winter to Cuba and Mexico.

Next to the Herring Gull this species undoubtedly is the most common of the larger gulls, but it is abundant only during the migrations, or in the southern part of the state during winter. Probably it formerly nested on some of the islands in Lake Huron and Lake Michigan, but we have no reason to suppose that it does so at present. Major Boies states that it breeds abundantly on islands to the east of Neebish Island in the St. Mary's River (Bull. Mich. Orn. Club, I, 18), and Mr. Butler informs us that he was told that it nested on the Beaver Islands near Petoskey, Michigan, and abundantly on Gull Island, near Escanaba (Birds of Ind., p. 573). This may have been true at that time (1896, 1897), but in 1904 none were to be found nesting on the Beaver Islands, and careful inquiry failed to reveal any evidence that they had nested there in recent years. It is possible that some still nest on the Gull Islands near Escanaba, but even this is doubtful. Kumlien & Hollister (Birds of Wisconsin, p. 10) state that it formerly bred on Spider and Strawberry Islands, Green Bay, from which localities eggs were taken in 1879, 1881, and 1882. Mr. J. H. Langille says that it breeds by thousands on one of the Western Islands on the eastern shore of Georgian Bay, Ontario, near Parry Sound. He states that the nests are placed on the ground, often so close together as almost to touch each other, and the nests as well as the eggs closely resemble those of the Herring Gull except that they are much smaller (Our Birds in their Haunts, 1884, p. 428).

This species is similar in general habits to the Herring Gull, but appears to be less given to the society of man, since it is not so often seen about our harbors; it also seems to visit the smaller streams and ponds much less frequently than its larger relative.

The eggs are similar to those of the Herring Gull, but smaller, averaging 2.39 by 1.71 inches.

TECHNICAL DESCRIPTION.

Head white and tail square in summer adult. Mantle pale pearl-gray; six outer primaries mostly black, with white tips or white spots near the tip; bill greenish-yellow crossed by a band of black near the tip, the black usually deepest on lower mandible. The winter adult is similar except that the head and neck are commonly streaked with dusky. The immature bird of the first year has the upper parts mottled with dusky brown and pearl-blue; the wing coverts quite dark with lighter margins, the primaries entirely black and the secondaries mostly so; tail with a broad band of black near the tip, the tip itself white. Length, 18 to 20 inches; wing, 13.60 to 15.75; culmen, 1.55 to 1.75.

16. Franklin's Gull. Larus franklini *Rich.* (59)

Synonyms: Franklin's Rosy Gull.—Larus franklini, Rich., 1831, and most authors. —Chroicocephalus franklini, Lawr., Coues, and some others.

A small nearly white gull with a black head; very similar to Bonaparte's Gull, but in adult plumage with the bill bright red instead of black. It is, however, very frequently confused with the latter species.

Distribution.—Interior of North America, chiefly west of the Mississippi River and east of the Rocky Mountains; breeds from Iowa northward; south in winter through Mexico and Central America to Peru.

Franklin's Gull, as shown by the above paragraph, is a western bird which should not occur in numbers on Lake Michigan, yet there are numerous records for the western side of the lake and it has been taken more than once near Chicago. We do not know of a Michigan specimen in any museum, nor is there an unquestionable record, yet it seems proper to include the species here, since it is practically certain that it does occur during migrations, at least in the western half of the Upper Peninsula. G. A. Stockwell ("Archer", Forest & Stream VIII, No. 23, p. 380) says: "Common in northern Wisconsin and adjoining parts of Michigan; is migratory." Kumlien & Hollister (Birds of Wisconsin, p. 10) say "Not common, but of regular occurrence in the eastern part of the state as a fall migrant from September until the small lakes and rivers are closed by ice." Butler states (Birds of Indiana, 1897, p. 574) that it has been occasionally seen by Mr. J. W. Byrkit at Michigan City, Ind. (less than ten miles from the Michigan line).

The bird is so similar in size, pattern of coloration, and general habits to the much more abundant Bonaparte's Gull that it might be easily overlooked, and doubtless this has happened many times. It nests abundantly in parts of Iowa and Minnesota, building substantial nests on rafts of floating vegetation, and lays three or four heavily spotted eggs similar to those of Bonaparte's Gull and averaging 1.95 by 1.34 inches. (See article by Dr. T. S. Roberts, Auk VII, 1890, 272).

TECHNICAL DESCRIPTION.

Tarsus not longer than the middle toe and claw. Adult in summer with the head leaden-black with a white spot on each eyelid. Mantle deep plumbeous; primaries bluish-gray all broadly tipped with white, and five outer ones with black sub-terminal spaces. Rest of plumage white, or rose-tinted in the breeding season. Bill bright red with a dark sub-terminal band. Winter plumage of the adult similar to the summer plumage, but the head nearly white with only a few dark touches about the eyes and on the nape; bill and feet with little trace of red. The immature young has the under parts white, the mantle mixed gray, brown and blue, and the head similar to that of the winter adult; the outer five primaries commonly wholly black. Length, 13.50 to 15 inches; wing, 11.25; culmen, 1.30.

17. Bonaparte's Gull. **Larus philadelphia** (Ord). (60)

Synonyms: Bonaparte's Rosy Gull, Black-headed Gull.—Sterna philadelphia, Ord, 1815.—Larus bonapartei, Rich., 1831, Nutt., 1834, Aud., 1839.—Chroecocephalus philadelphia, Lawr., 1858, and many others.

A small white gull with pearl blue mantle and head entirely black all over except small white spots one above and one below each eye; the bill black. This is the adult bird in spring and can hardly be confounded with anything else.

Distribution.—Whole of North America, breeding mostly north of the United States. Not yet recorded from south of the United States, though reported from the Bermudas.

This is the smallest gull, in fact the only small gull which is at all common in Michigan waters. So far as we know at present it is a migrant only, retiring south of our boundaries during winter and passing entirely north of our limits in summer.

There seems to be much uncertainty about the nesting of this bird. Several writers state that formerly it nested abundantly in all suitable localities along the lakes (Covert 1894-95); but it seems certain that the species does not breed now at St. Clair Flats, although it is said to have done so formerly, "laying its eggs on old logs with no signs of a nest." (Collins, Bull. Nutt. Orn. Club, V, 1880, p. 62). Dr. R. H. Wolcott writes that in the summer of 1893 it was very common all summer on Lake St. Clair, and many were shot by members of the Michigan Fish Commission in order to obtain parasites. Major Boies states that it is common on the St. Mary's River in summer and breeds on or near Neebish Island. He found perfectly fresh eggs in June on a small island on the west side of Neebish (Bull. Mich. Orn. Club, I, 18). It has been said also to nest in numbers on some of the islands in Green Bay, Wisconsin, but the record is not entirely satisfactory. In Kumlien & Hollister's "Birds of Wisconsin" p. 10, we read "In 1880 a few were said to breed on Chambers Island, Green Bay, and we saw on some small islands in Big Bay de Noquet, Michigan, a number of nests like pigeons' nests on the flat branches of low coniferous trees that without question had been used by these birds. Many full plumaged birds were seen and numbers of young, but only one so young as to be still unable to fly."

The birds are commonly seen in flocks and usually breed in colonies, many pairs using the same region, commonly an island. The usual nesting place of this bird is in the far north, where it builds its nest early in June, usually on the horizontal branches of spruce trees and from five to twenty feet from the ground. The nests are made of twigs, grasses and evergreen leaves, and the eggs are almost invariably three. These are olive green to olive gray, marked with small brown spots, and average 1.95 by 1.34 inches.

TECHNICAL DESCRIPTION.

Adult in summer with the bill deep black, head dark slate, and mantle pale pearl-gray; feet orange red. Three outer primaries mostly white, but with large black tips; rest of primaries pearl-gray tipped with white, the fifth and sixth with subterminal black spaces. Rest of plumage pure white, or rose-tinted in the breeding season. In winter plumage the adult has the black of the head mostly replaced by white, only the crown and hind part of head being mottled with grayish-black and white, and a slaty patch on the side of the head; the feet flesh colored. Immature bird of the first year similar to the winter adult, but with more dark coloring on the head; first primary with about half the inner web black, second or third with outer webs wholly black, and tail with a broad sub-terminal dark bar. Length, 12 to 14 inches; wing, 10.25; culmen, 1.20.

18. Sabine's Gull. Xema sabini (*Sab.*). (62)

Synonyms: Fork-tailed Gull.—Larus sabini, Sabine, 1819, Nutt., 1834, Aud., 1835. —Xema sabini of most recent authors.

Likely to be mistaken for Bonaparte's or Franklin's Gull, but the adult always separable by the somewhat forked tail and the slate black head and neck bounded below by a narrow black ring.

Distribution.—Arctic regions; in North America south in winter to New York, the Great Lakes, and Great Salt Lake; casual in Kansas, Bahama, and on coast of Peru.

The claim of Sabine's Gull to a place in the fauna of Michigan rests mainly on the statement of Covert that one specimen, a female, was secured on the Huron River, Ann Arbor, November 17, 1880 (Birds of Washtenaw County, 1881). This specimen is said to have been killed by Mr. James Bowyer, but cannot be located now. A male was taken on Delavan Lake, Wisconsin, October 7, 1900 (Auk, XVIII, 392); two were taken on the Mississippi River near Burlington, Iowa, October 16, 1891, and October 12, 1894 (Auk, XVI, 86). Mr. E. W. Nelson states that on April 1, 1873 while collecting along the shore of Lake Michigan in Illinois "I shot a specimen in breeding plumage, but it fell just beyond my reach and a gale off shore soon drifted it out of sight." (Bull. Nutt. Orn. Club, I, 41). These are the only records for Michigan and its vicinity which are known to us.

This gull nests in the far north, in Alaska, Siberia, and Greenland, and probably along most of the shores and islands of the Arctic Ocean. Its nest is placed on the ground, commonly in the moss of the tundra, and the eggs are three or four, olive or olive green spotted with dark brown, and averaging 1.78 by 1.26 inches.

TECHNICAL DESCRIPTION.

"Tail forked; legs and feet black. Summer adult: Head and upper neck uniform plumbeous, bordered below by a black collar; mantle deep bluish-gray; quills (primaries) black, the five innermost ones varied with white and plumbeous; rest of plumage white; bill black tipped with yellowish. Winter adult: Similar, but head and neck white except ear coverts and back of head and neck, which are dull, dusky plumbeous. Young: Mantle brownish gray, each feather darker subterminally, and margined at tip with pale fulvous or buffy; tail white, with a broad black band near end, this again narrowly tipped with white; upper tail coverts and entire lower parts white." (Ridgway).

Length, 13 to 14 inches; wing, 10.10 to 11.15; tail, 4.50 to 5 (forked for about .60 to 1.00); culmen, 1; tarsus 1.25.

19. Caspian Tern. Sterna caspia (*Pall.*). (64)

Synonyms: Imperial Tern.—Sterna caspia, Pall., 1770, Lawr., Baird, Coues, Ridgw.

Readily separated from any but the Royal Tern by its large size, and from the Royal Tern by its slightly forked tail.

Distribution.—Nearly cosmopolitan; in North America breeding southward to Virginia, Lake Michigan, Texas, Nevada, and California.

This beautiful tern is far from common in Michigan waters. A few are seen spring and fall on lakes Erie, Huron, and Michigan, and colonies of the birds have long been known to nest on certain islands belonging to Delta county, Michigan, lying in the entrance from Lake Michigan to Green Bay, and also on certain of the Beaver Islands, belonging to Charlevoix county, Michigan. At both these places the birds have been persecuted from time immemorial by fishermen and Indians who use their eggs as well as those of other terns and gulls for food, and unless better protection is afforded, the extinction of the colonies cannot be long postponed. The nests are placed on gravelly or shingly islands, are usually pebble-lined, and the two or three eggs (rarely four) are very variable in ground color, ranging from grayish white to pale olive, and more or less thickly spotted with brown and black, the spots commonly small and distinct. The eggs average 2.66 by 1.77 inches.

Doubtless nesting begins in May, but owing to the relentless persecution of the eggers few young are hatched until late in June, and the writer found fresh eggs and newly hatched young on the Beaver Islands July 11, 1904.

In Michigan at least the Caspian Tern seems always to nest in communities, several hundred pairs nesting on the same island. Its flight is remarkably strong, and it has the appearance of being very short-tailed. Its note is a very harsh "squawk" entirely different from that of any seabird of our acquaintance; once heard it can scarcely be mistaken afterward. Like all other terns this bird feeds mainly, if not entirely, on fish which it secures by plunging headlong into the water in the manner of the Kingfisher and Fish Hawk, oftentimes going completely out of sight beneath the water.

TECHNICAL DESCRIPTION.

Whole top of head from bill to occiput, extending below the eyes, jet-black; remainder of head and neck, together with breast and entire under parts, snowy-white; mantle pearl-gray. Primaries mostly gray with darker tips, the area extending farther toward the base on the inner web than on the outer, the shafts pure white. Bill coral-red with a more or less dusky tip. Feet and legs black. After the nesting season is over the black of the crown becomes flecked with white and in winter the amount of white increases until the top of the head is streaked black and white. The young in the first winter are pale grayish above with some dusky spots on the back and inner secondaries; the top of head mixed black and white or gray; each tail feather with a dusky spot near the end; under parts entirely white. Length, 19 to 23 inches; wing, 15 to 17.50; tail, 5.30 to 6.75 (forked for .75 to 1.60 inches); culmen, 2.48 to 3.10.

20. Royal Tern. Sterna maxima *Bodd.* (65)

Synonyms: Cayenne Tern.—Sterna maxima, Boddaert, 1783.—Sterna cayana, Lath., 1790, Nutt., 1834, Aud., 1835.—Sterna regia, Gamb., 1848, Coues, 1872, Baird, 1859.

Similar in size and general appearance to the Caspian Tern, but separable at gunshot range by the length of the deeply forked tail. The present species is slightly smaller than the Caspian; it also has an occipital crest, and the inner webs of the primaries are black only next the shaft, the remainder being pure white, while in the Caspian Tern these webs are entirely gray or slate colored.

Distribution.—Tropical America, and warmer parts of North Anerica, casually northward to Massachusetts, the Great Lakes and California. West coast of Africa north to Tangiers.

As shown by the distribution quoted above, this species is much more southern than the Caspian, and we should not expect to find it in Michigan waters except as a straggler. Its right to a place in our fauna rests mainly upon the statement of Mr. Stewart E. White, who says that during his stay on Mackinac Island in the summers of 1889, 1890 and 1891, he examined several specimens, but that it appeared to be more rare than the Caspian Tern (Auk X, 1893, 222). There is a doubtful record of this bird for Milwaukee, Wis., and it has been recorded by one or two observers as seen during migration; but identification under such circumstances is questionable. There is a mounted specimen of an adult in the Barron collection at Niles, without any label, which may have been taken in that vicinity as the present owners claim that all the specimens are local.

This species nests only at the south, the best known resorts being the Tortugas, off the coast of Florida, certain islands along the Texas coast, and a few islands along the Atlantic shore even as far north as Virginia. The eggs are very similar to those of the Caspian Tern, and average 2.61 by 1.78 inches.

TECHNICAL DESCRIPTION.

Adult in nesting season: Entire top of head, including the occiput, deep black, the occipital feathers lengthened and pointed forming a distinct crest; back and upper surface of wings pale pearl-gray, the upper tail-coverts and tail almost white; under parts pure white. Outer primaries with the inner web slate-colored or black next the shaft, the remainder of the inner web pure white, the line of division very sharp. Bill orange; feet black. Immediately after nesting the forehead and crown become white, only the occipital crest remaining clear black. In winter the plumage is similar, but even the occipital crest becomes mixed with white, and the orange bill becomes paler. Young birds are somewhat like winter adults, but are more or less mottled with brown above, the crest hardly visible, the tail-feathers with grayish brown or dusky tips.

Length, 18 to 21 inches; wing, 14 to 15; tail, 6 to 8 (forked about one-half); culmen, 2.40 to 2.75.

21. Forster's Tern. Sterna forsteri *Nutt.* (69)

Synonyms: Havell's Tern (Audubon's name for the immature bird).—Sterna forsteri, Nutt., 1834, and most subsequent writers.—Sterna havelli, Aud., 1839.

Not to be distinguished from either the Common Tern or the Arctic Tern except with specimens in hand.

Distribution.—North America generally, breeding from Manitoba southward to Virginia, Illinois, Texas, and California; in winter southward to Brazil.

According to several writers this should be one of the common terns of Michigan, but as a matter of fact, there are remarkably few actual records. It was reported by most of the earlier writers to breed commonly at St. Clair Flats, and according to Swales (1904), there is little doubt it does nest there, although he has never taken it. We have a single specimen in the Agricultural College collection which was taken on Long Lake, Kalamazoo county, May 24, 1884, by Dr. Gibbs. B. H. Swales has a specimen taken on the lower Detroit River, Sept. 10,1890, by J. Claire Wood, (Auk, XXIV, 1907, 137). In his Birds of Indiana (p. 576) Butler states that it is the most common tern on Lake Michigan during the fall. In Kumlien & Hollister's "Birds of Wisconsin," p. 12, it is said to be a common migrant during the first two or three weeks of May and again from September until the middle of August; and still later on Lake Michigan. There is little doubt that the Detroit and St. Clair rivers mark the eastern boundary of the range of this species; while it occurs in much greater abundance in the Mississippi Valley. Unlike the Common and Arctic Terns this species prefers to nest in marshes instead of on sand or gravel, and its nests are often built on floating vegetation or on ridges of refuse washed up by the waves. Its eggs are similar to those of the Common Tern and equally variable in color and markings. They average 1.78 by 1.23 inches.

TECHNICAL DESCRIPTION.

So similar to the Common Tern in corresponding seasonal dress as to be separated with difficulty and then only with specimens in hand. The two species have precisely the same measurements except that the tail of Forster's Tern will average about an inch longer. Two points alone can be depended upon for separating them: In Forster's Tern the breast and belly are pure white and the inner web of the outer tail feather is always darker than the outer web, which is entirely white. In the Common Tern the breast and belly are pearl gray and the outer web of the outer tail feather is dark, while the inner web is white. These two differences in coloration are constant summer and winter. In other respects winter specimens of these two terns are almost precisely alike and the same may be said of the young of the year.

Length, 14 to 15 inches; wing, 9.50 to 10.30; tail, 5 to 7.70 (forked for 2.30 to 5 inches); culmen, 1.50 to 1.65.

22. Common Tern. Sterna hirundo *Linn.* (70)

Synonyms: Sea Swallow, Mackerel Gull, Wilson's Tern, Lake Erie Gull.—Sterna hirundo, Linn., 1758, Wils., 1813, Nutt., 1834, Aud., 1838.—Sterna wilsoni, Bonap., 1838, Baird, 1859.

In full plumage may be distinguished by its red bill with the terminal third black, breast and belly light gray, and outer web of outer tail-feather dark, the inner web being white.

Distribution.—Greater part of Northern Hemisphere and Africa. In North America chiefly east of the Plains, breeding from the Arctic coast, somewhat irregularly, to Florida, Texas, and Arizona; and wintering northward to Virginia. Also coast of Lower California.

The commonest tern in Michigan waters, frequenting the shores and islands of the Great Lakes, as well as all the principal streams and interior lakes, and likely to appear on any pond or pool during migrations. It is absent from our waters only during the severest part of the winter and is one of the attractive features of the water about our summer resorts. Formerly it was much more numerous than at present, but the craze for bird plumage for millinery purposes well nigh exterminated the terns, thousands being killed on their nesting grounds, so that for a time the species was threatened with extinction. During the past ten years some legal protection has been secured for them and the cultivation of popular sentiment by the Audubon societies and their friends has lessened the destruction for such purposes.

In common with other birds which nest in colonies the eggs are used as food by fishermen, Indians and other more or less irresponsible persons, and the wasteful methods employed not only prevent increase, but in many instances have driven the birds away from their favorite nesting grounds. Formerly it was not an uncommon thing for parties to visit an island and break every egg which could be found, going thoroughly over the surface and taking pains not to omit a single nest. On a second visit a day or two later any eggs found were sure to be fresh and were collected and carried away. This method, however, so often resulted in the desertion of the island by the terns that it has become customary on the first visit merely to collect all the eggs of the colony into a few large heaps without breaking any eggs or otherwise disturbing the nests. The birds then continue to lay in the same nests and often a supply of fresh eggs is obtained in this way for a month or six weeks. The present law makes such action as this punishable by fine or imprisonment, or both, and it is hoped that strict enforcement of the law may be obtained.

The terns feed mainly on fish and perhaps are not of any great economic importance, but they are among the most graceful birds in the world and their beauty of plumage, sprightly actions and entire lack of harmful qualities commend them to the public at large, as well as to the bird lover. This species differs much in its nesting habits according to circumstances. It loves to lay its eggs in little hollows in the clear sand, but it frequently lays them among the coarser pebbles without a vestige of nesting material, while in other places it makes a hollow in the sand or gravel and lines it with grass, weed-stalks or "sea-wrack." As a rule it avoids inland marshes and prefers to nest on open sandy islands rather than among the rushes and sedges. At St. Clair Flats Langille states that it most often lays its eggs on the tops of old musk-rat houses. The eggs are commonly three, very variable in ground color, which ranges from buffy-white to greenish-olive, covered sometimes thinly, sometimes very thickly, with dots, spots, and blotches of various shades of brown, sometimes even black. The eggs average 1.57 by 1.17 inches.

TECHNICAL DESCRIPTION.

Adult in breeding plumage: Entire upper half of head from bill to occiput black; sides of head and throat pure white; rest of under parts very pale gray, often almost white; mantle pearl gray; primaries deep gray with the inner half of the inner web pure white except near the tips; outer primary with outer web black, other primaries with outer webs like mantle; outer tail feather with outer web dark gray, inner web white; the remaining tail feathers with inner web paler gray, the central pair entirely white. Bill red with black tip; feet orange-red. The winter adult is similar except that most of the black of the head is replaced by white or gray; often the crown alone shows black, the forehead and sides of the head being entirely white. Young: So similar to those of several other species that only the expert can separate them, and for this purpose reference should be had to the detailed descriptions of Baird, Ridgway, or Coues. Length, 13 to 16 inches; wing, 9.75 to 11.75; tail, 5 to 7 inches, so deeply forked that the inner feathers are at least 3 inches shorter than the outer; culmen, 1.25 to 1.50.

23. Arctic Tern. Sterna paradisæa *Brunn.* (71)

Synonyms: Sea Swallow, Common Tern.—Sterna macroura, Naum., 1819, Lawr., 1858, Baird, 1859, Coues, 1872, etc.—Sterna arctica, Temm., 1820, Nutt., 1834, Aud., 1835.

Figure 7.

The adult in summer may be known by its entirely red bill, but in other respects is so like the Common Tern that it cannot be separated except by careful examination.

Distribution.—Northern Hemisphere; in North America breeding from Massachusetts to the Arctic regions, and wintering southward to Virginia and California.

This is the most northern member of the genus and is known to nest in the Arctic regions almost as far toward the pole as man has gone. It has been recorded from regions both sides of Michigan, and there is no reason why it should not occur here in some numbers during migrations. It is so similar, however, to the Common Tern that it is very readily overlooked.

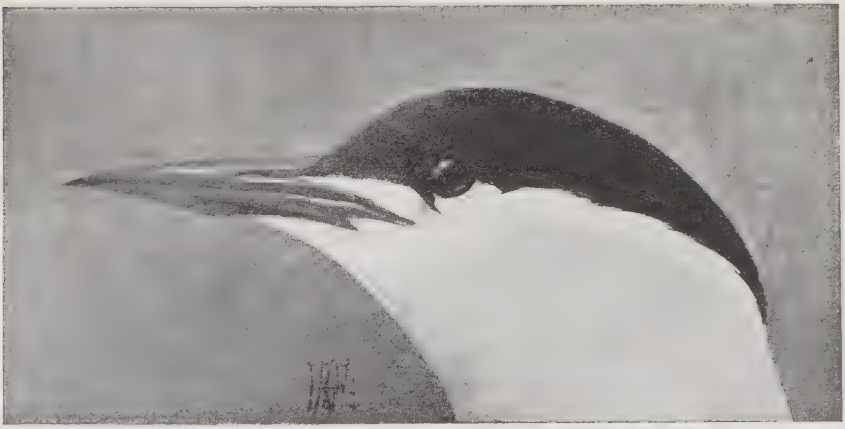

Fig. 7. Arctic Tern. Natural size.
From Coues' Key to North American Birds, 5th ed. Dana Estes & Co.

The sole record for the state so far as we know is that of Mr. A. B. Covert of Ann Arbor, who states that he "secured a male bird at Monroe, Mich., April 9, 1875." Kumlien & Hollister in the "Birds of Wisconsin" (page 13) say "A somewhat irregular migrant, at times fairly common, and again quite the opposite. We have taken it nesting in Green Bay, 1879, and in June, 1891 procured a set of eggs, the parent shot over the nest, at Lake Koshkonong."

On the New England coast where the bird nests abundantly, it does not differ in habits from the Common Tern except that it seems to be unusually fond of its own society and is seldom found mingling with other species of terns.

The nest and eggs are indistinguishable from those of the Common Tern.

TECHNICAL DESCRIPTION.

Strikingly like Forster's Tern, except in two respects. The breast and belly are light gray as in the Common Tern and the outer web of the outer tail feather is darker than the inner web, in this respect also resembling the Common Tern. On the other hand the Arctic Tern has a decidedly longer tail, which averages 7½ inches, and the bill is all red with no black on the tip (both the Common and Forster's Tern have dusky tipped bills). The adults and young of the year are with difficulty separable from corresponding plumages of the other three species. Length, 14 to 17 inches; wing, 10 to 10.75; tail, 6.50 to 8.50 (forked for 4 or 5 inches); culmen, 1.08 to 1.40.

24. Least Tern. Sterna antillarum (*Lesson*). (74)

Synonyms: Little Tern, Minute Tern, Sea Swallow.—Sternula antillarum, Less., 1847.—Sterna minuta, Wils., 1813, Aud., 1838, and others.—Sterna frenata, Gamb., 1848, Lawr., 1858, Baird, 1859.—Sterna superciliaris, Coues, 1872.

Recognizable by its small size, yellow bill and feet, and deeply forked tail. In size and general coloration it resembles the Black Tern in immature or winter plumage, but the latter always has black bill and feet and the short tail is but slightly forked.

Distribution.—Northern South America, northward to California, Minnesota, and New England, and casually to Labrador, breeding nearly throughout its range.

This dainty little seabird is almost or quite unknown in Michigan at the present time, but there is some reason to believe that it once occurred regularly although in small numbers. It is included in Dr. Miles' List of 1860 on the authority of Prof. Fox who is said to have taken a specimen at Grosse Isle, Detroit River. There is also a mounted specimen in the University of Michigan Museum at Ann Arbor, labeled "Michigan" which may have been taken in that vicinity. In the MS. notes of A. B. Covert there is a record of a male taken at Sandshore Lake, Ann Arbor, May 4, 1873, as well as "three specimens (two males and one female) taken at Bayport, Huron county, October 13, 1878." None of these specimens can be located, however, and it is not impossible that they were in reality fall specimens of the Black Tern, which has been mistaken repeatedly for the present species. The Barron collection at Niles was said to contain a specimen of the Least Tern, but a personal examination by the writer in November, 1905 failed to reveal any such specimen, although a single Black Tern in fall plumage, and without label, was found. A skin of an adult male in breeding plumage, from the Gunn collection, is now in the Kent Scientific Museum in Grand Rapids, but bears on the label (apparently the collector's label) "Short-tailed Tern, Warsaw, Ill." The Albion record credited to O. B. Warren by Cook proves to be erroneous.

It formerly nested sparingly about some of the small lakes in northern Indiana, and possibly may do so still. Dr. Wheaton reported it as of irregular occurrence along the Lake Erie shore in Ohio, and there are several old records for southern Ontario. This species has disappeared almost completely during the last thirty years from places in southern New England, where it was once abundant, but within the past few years a few pairs have reappeared here and there, and possibly, if well protected, it may reestablish itself in the Lake Region.

Its habits are similar to those of the Common and Arctic Terns, with which it frequently associates, and it prefers to nest on sandy or pebbly islands where its three or four eggs are laid in a little hollow scooped in the sand, with little or no nesting material. The eggs are white, buffy-white or buff, variously spotted with gray, brown and purplish, and average 1.28 by .91 inches.

TECHNICAL DESCRIPTION.

The adult in summer seems almost a miniature of the Common Tern, having nearly the same proportions, with the same slender, forked tail, and the same general pattern of coloration. Closer comparison, however, shows that the present species has the forehead and a short extension backward over the eye pure white, the lores and crown black, mantle and upper surface of tail pearl-gray, and under parts entirely white. The bill is yellow, usually tipped with black, and the feet are orange. In winter most of the black of the head is replaced with gray or white, only the occiput remaining black; the yellow bill and feet also may become duller or paler, but never black. The young of the year besides having shorter outer tail feathers (which are common to all young terns), has the upper parts more or less spotted and mottled with buff and black, and the tail feathers similarly blotched near the ends.

Length of adult, 9 inches; wing, 6.75 to 7.00; tail, 3.50 (forked for at least 1¼ inches); culmen, 1.10.

25. Black Tern. Hydrochelidon nigra surinamensis (*Gmel.*). (77)

Synonyms: Short-tailed Tern, Sterna surinamensis, Gmel., 1789.—Hydrochelidon surinamensis, Bonap., 1856.—H. plumbea, Lawr., 1858.—Sterna plumbea, Wils., 1813. Sterna nigra, Sw. & Rich., 1831, Nutt., 1834, Aud., 1835.—Hydrochelidon lariformis surinamensis, Ridgw., 1881.

Readily distinguished by its small size, black body, and black bill. The tail also is much less forked than in the other common terns, which has given it the name Short-tailed Tern.

Distribution.—Temperate and tropical America. From Alaska and the fur countries to Brazil and Chili, breeding from the middle United States west of the Alleghanies northward.

An abundant bird during the summer in all suitable places, at least throughout the Lower Peninsula. It seems to prefer the marshy edges of rivers and lakes, or the marshes themselves, provided they have open pools here and there. It breeds abundantly along the Detroit River and St. Clair Flats, the St. Clair River, Saginaw Bay and numerous points in the interior of the state. It arrives from the south early in May and remains until after the first of September (Swales). Doubtless in some seasons it comes earlier and remains much later. It nests in large or small communities, placing its two or three eggs on mats or windrows of floating vegetation, or sometimes on a floating plank or log; the nest usually is only a hollow in the vegetation, although sometimes the materials appear to be slightly arranged.

The eggs are similar to those of the other terns, but commonly more heavily spotted, the ground color being pale olive. Eggs average 1.35 by .98 inches. The young and adults after the nesting season lose much of their dark color, and when seen at a little distance may be readily mistaken for the Least Tern, especially by one who has never seen the latter species in life.

TECHNICAL DESCRIPTION.

The Black Tern in adult plumage can hardly be confounded with any other bird, being so dark all over as to appear sooty-black at a little distance. Winter adults and young, however, show much white, but can always be separated from the Least Tern by the black bill and feet and the comparatively short and slightly forked tail. The adult in summer is entirely black or dark slate-color except the under tail-coverts which are white, and the under surface of the wings and tail which are very light slate. Usually the head, neck and breast are sooty-black, the remainder of the upper parts being slate-color; the bill and feet black. In winter the adult has the forehead, nape and most of the under parts pure white; the crown, occiput and auricular region mixed black or slaty and white; the back, wings and tail pearl-gray. The young of the year are similar to winter adults, but always have more or less brownish on the upper parts and are rather gray than clear white on the sides below. Length of adult 9.00 to 10.25 inches; wing, 8.25; tail, 3.75 (forked .90 inch); culmen, 1.10.

Order IV. STEGANOPODES. Totipalmate Swimmers.

KEY TO FAMILIES.

A. Bill without visible nostrils but distinctly hooked at tip. B, BB.
  B. Tail deeply forked. Family 14, Fregatidæ, Frigate Birds (not found in Michigan).
  BB. Tail not forked. C, CC.
    C. Bill less than five inches long. Family 12, Phalacrocoracidæ, Cormorants. Page 66.
    CC. Bill more than ten inches long. Family 13, Pelecanidæ Pelicans. Page 68.
AA. Bill not distinctly hooked at tip. D, DD.
  D. With small but distinct nostrils. Family 9, Phaethontidæ, Tropic Birds (not found in Michigan).
  DD. Without visible nostrils. E, EE.
    E. Tail fan-shaped, rounded; neck very long and slender. Family 11, Anhingidæ, Snake Birds (Tropical birds of doubtful occurrence in Michigan. See Appendix).
    EE. Tail cuneate or wedge-shaped; neck short and thick. Family 10, Sulidæ, Gannets. Page 65.

Family 10. SULIDÆ. Gannets.

26. **Sula bassana** (*Linn.*) Gannet. **(117)**

Synonyms: Common Gannet, Soland Goose, Solon Goose.—Pelecanus bassanus, Linn., 1758.—Sula bassana, Briss., Nutt., Aud., and authors generally.—Sula americana, Bonap., 1838.—Pelecanus maculatus, Gmel., 1788 (young).

The four-toed, fully webbed feet, wedge-shaped tail and large size form a combination which is characteristic, the shape of the tail and the pointed bill without a hooked tip separating it perfectly from the pelicans and cormorants with which it might otherwise be confounded.

Distribution.—"Coasts of the North Atlantic. Breeds on Bird Rock and Bonaventure Island in the Gulf of St. Lawrence and on islets off the British Islands. Winters from North Carolina coast south to Gulf of Mexico, and on coasts of North Africa, Maderia, and the Canaries; occurs off eastern United States in migration; casual north to Greenland; accidental in Indiana and Ontario." (A. O. U. Check-list, 3d edition).

The Gannet is a North Atlantic seabird depending for its food solely on fish and rarely found at any distance from the coast. In America it is most abundant in and about the Gulf of St. Lawrence, where doubtless some individuals remain throughout the year, although the majority move southward during the winter, at which season they are not uncommon along the Maine coast and even somewhat farther south.

Inland records at any season are rare and there are but one or two records (and these not perfectly authenticated) for the Great Lakes. It is therefore with much pleasure that we are able to record the capture in Michigan of a fine specimen of this bird and its preservation in the University Museum at Ann Arbor. This bird, an immature female in the white-spotted brown plumage, was shot October 19, 1911, by Mr. J. P. Case, on a small lake in Hamburg township a few miles north of Ann Arbor. Mr. Norman A. Wood of Ann Arbor, to whom we are indebted for the record, states that when first observed the gannet appeared to be asleep, since it was resting with the head hidden beneath the wing in the manner of a domestic goose. Evidently it was weak from lack of food if not from fruitless wandering.

Gannets nest always in communities, and build bulky nests of seaweeds on ledges and shelves of almost inaccessible rocks. The largest and best known nesting grounds in this country are on the Bird Rocks in the Gulf of St. Lawrence, but the species formerly nested on one or more islets off the coast of Maine. Only a single egg is laid, which is at first pure white with a thick chalk-like shell which soon becomes soiled and stained by the feet of the bird and the materials of the nest. The egg measures about 3 by 1.92 inches.

TECHNICAL DESCRIPTION.

"Lower jaw (i. e. malar region), together with sides of chin and throat, densely feathered. Legs and feet blackish. *Adult:* White, the remiges (wing-feathers) dusky brown, the head and neck above washed with buff. *Young:* Dusky, everywhere streaked or speckled with white. Length 30—40.50 inches; wing about 19.50; tail 10, culmen 4. (Ridgway.)

Family 12. PHALACROCORACIDÆ.—Cormorants.

KEY TO SPECIES.

A. Tail of 14 feathers.—Common Cormorant. (Appendix.)
AA. Tail of 12 feathers.—Double-crested Cormorant. No. 27.

27. Double-crested Cormorant. Phalacrocorax auritus auritus (*Less.*). (120)

Synonyms: Cormorant, Shag, Water Turkey.—Carbo auritus, Lesson, 1831.—Pelecanus (Carbo) dilophus, Sw. & Rich., 1831.—Graculus dilophus, Gray, 1849.—Phalacrocorax diplohus, Nutt., 1834, Aud., 1835, Ridgw., 1881, Coues, 1882.

Figures 8 and 9.

Readily recognized from its size, black color, duck-like legs and feet (but with the four toes all connected by webs), long neck, very small head with bill hooked like a hawk's, and entire lack of nostrils.

Distribution.—Eastern North America, breeding from the Bay of Fundy, the Great Lakes, Minnesota and Dakota northward; south in winter to the southern states.

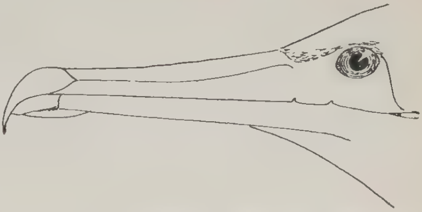

Fig. 8. Double-crested Cormorant. Reduced. (Original.)

This bird seems to be generally distributed over the state during the migrations, but is nowhere common. Most writers and observers state that it is a rare migrant, but specimens have been taken in almost every county in the state, and probably there are few sheets of water of any size within our limits which are not visited by this bird occasionally. The following records will give some idea of its migration: Saginaw River, May 29, 1896 (Eddy); Oakland County, May 3, 1902 (Swales); Mouth of Huron River, April 12, 1875 (Covert); Sault Ste. Marie, May 6, 1901 (Melville); Oakland County, October 6, 1904 (Swales); St. Mary's River, September 26 (year?) (Boies); Tuscola County, October 12, 1898 (Eddy); Wyandotte, October 25, 1904 (Barrows); Cadillac, November 13, 1897 (Selous). There are also records without dates from Lansing, Kalamazoo, Muskegon County, and Monroe. Undoubtedly more specimens are noticed in fall than in spring because many more people are in the field during the fall shooting, and also because there are actually more birds in the fall, the young of the year being added to those which went north in the spring.

The distribution as given above would indicate that possibly the species nests about the Great Lakes, but I know of no breeding record for Michigan, and the nearest point of which I find a recent record is Shoal Lake in Northern Minnesota. According to Mr. Chas. Dury it nested at St. Mary's Reservoir, western Ohio, 25 or 30 years ago. The nests are placed sometimes on rocky ledges, sometimes on low bushes, sometimes on trees, preferably dead ones. They are built of sticks, roots, and twigs, and the eggs, from two to five, are greenish white with a more or less chalky shell. They average 2.52 by 1.59 inches.

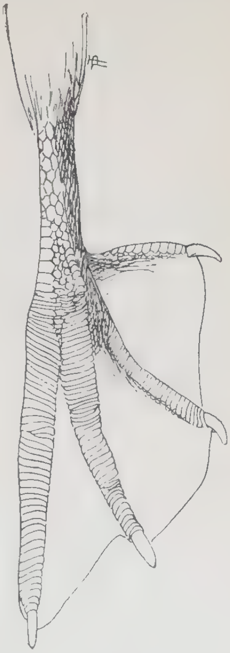

Fig. 9. Foot of Double-crested Cormorant. (Original.)

The bird is so seldom seen that few have observed it in life, and no one appears to be familiar with its habits in Michigan. It dives easily and constantly and remains for a long time under water, in this respect resembling the loons and grebes. It is also frequently mistaken for a duck, but the length of the neck should prevent an error of this kind. The fact that it frequently alights on dead trees, the points of high rocks, or even on the tops of boat houses and other buildings about the water is a point likely to attract attention at once and prevent its being mistaken for a duck. The bird is like most other Steganopodes in having no external nostrils; breathing when adult entirely through the mouth. This is true of all species of cormorant so far as known, and F. A. Lucas states (Auk XIV, 87) that "Probably the external nostrils close about the time the young cormorants take the water and begin to feed themselves."

TECHNICAL DESCRIPTION.

The adult in breeding plumage differs from the winter adult mainly in the clear black and more glossy plumage and the presence on each side of the head of a tuft of narrow, slender, black feathers. The winter adult has the entire under parts black, as also the rump, tail, and head and neck all around; the back and upper surface of the wings light brown, each feather margined with black; bare skin of the gular pouch orange in summer, yellowish at other times. The tail has but twelve feathers. Immature birds have no glossy black at all, but are gray, brownish-gray or brown, darker above and lighter below, but always known by the peculiar, hooked bill, fully webbed feet and long stiff tail with twelve feathers. Length of adult 29 to 34 inches; wing, 12 to 13; tail, 6 to 6.50; bill, 2 to 2.50.

Family 13. PELECANIDÆ.—Pelicans.

KEY TO SPECIES.

A. Twenty-four tail-feathers; lower jaw feathered, plumage of body entirely white or with yellow on chest.—White Pelican. No. 28.

AA. Twenty-two tail feathers, lower jaw naked, plumage of body mixed brown, gray and white.—Brown Pelican. No. 29.

28. White Pelican. Pelecanus erythrorhynchos *Gmel.* (125)

Synonyms: Common Pelican (of the north).—Pelecanus trachyrhynchos, Lath., 1790. —P. onocrotalus, Bonap., Nutt.—P. americanus, Aud.

A nearly white bird with black wing-tips and an expanse of eight or ten feet can hardly be mistaken for anything else; and when this is coupled with the possession of fully webbed feet and a bill at least a foot long with leathery pouch below the bill there is no possibility of mistake.

Distribution.—Temperate North America, north in the interior to about latitude 61°, south in winter to western Mexico and Guatemala; now rare or accidental in the northeastern states; abundant in the interior and along the Gulf coast; common on the coast of California.

This bird is little more than a straggler in Michigan, yet there are many authentic records, and the bird is such a large and remarkable one that when captured the specimens have been preserved in most cases. It is a well known species in the Mississippi Valley and the lakes of the Great Plains region, and nests abundantly, and usually in colonies, in Manitoba and other parts of British North America. There is no record of its nesting in Michigan nor any likelihood that it has ever done so. It most often occurs here in pairs or small squads, seldom more than four or five being seen together. The following are the records I have collected: Clam Lake, Wexford county, April, 1892 (Covert); Whitmore Lake, Washtenaw county, October 4, 1878, and Lake Wade, July, 1879 (Covert); Sarnia Bay, opposite Port Huron, no date (Hazelwood); Detroit River, July, 1902 (Swales); Detour, Chippewa county, fall of 1894, and another in Hay Lake, St. Mary's River, earlier in the same year (Boies); two specimens in the Broas collection at Belding, without data, but probably taken in that vicinity (Barrows); Monroe, about 1882, mounted by B. J. Savage of Monroe (Savage was with the man who shot it and says it was one of four which were seen and followed from place to place for several hours) (Barrows); three killed in the vicinity of Marquette, and mounted by F. H. W. Bailey of that city, the last one killed near Baraga in the spring of

1903 (Barrows); one killed at Dorr, Allegan county, September 1892 (O. & O. XVII, 143); one killed at Tecumseh, Lenawee county in 1882 (L. W. Watkins); one specimen in Agricultural College Museum without data, perhaps the specimen recorded by Cook (page 31) as from Berrien county; two killed in Hillsdale county and mounted for a storekeeper at Hillsdale (Hankinson); two shot in St. Joseph county and now in the collection of Adolph Beerstecker (Gibbs, list of 1879); one killed near Port Huron about September 26, 1877 (F. & S.); one seen and shot at on Keweenaw Point "a few years since" (Kneeland, 1856-57); two shot October 31, 1905, by Ira J. Boughton, on Indian Lake, near Pentoga, Iron county.

The nest is bulky and placed on the ground, being "only a heap of earth and gravel raked into a pile about six or eight inches high and about twenty inches broad on the top, which is only very slightly hollowed" (Ridgway). The eggs are two or three, white chalky, and more or less stained. They average 3.34 by 2.22 inches. The period of incubation is stated by Bendire to be about twenty-nine days; at least that was all the time taken by a hen to hatch pelican eggs placed under her.

TECHNICAL DESCRIPTION.

The largest of our water birds except the swans, and recognizable by its black and white plumage, its huge bill, a foot or more long, with its great pouch of elastic skin below. The sexes are alike in color, mainly pure white; the flight feathers (primaries and most of secondaries) jet-black; bill and pouch reddish; feet red in summer, yellow in winter. In breeding plumage there is a drooping crest of white or pale yellow feathers from the back of the head, the chest and lesser wing coverts are pale yellow, and there is a bony wart-like knob or ridge near the middle of the upper mandible. This knob and the occipital crest are shed after the breeding season. Young birds lack the black wing feathers, but have a little brown or gray in the wings and on the head; otherwise they are white.

Length of adult, 4½ to 6 feet; spread of wings, 8 to 10 feet; wing, about 2 feet; bill 12 to 15 inches.

29. Brown Pelican. Pelecanus occidentalis *Linn.* (126)

Synonyms: Common Pelican (of Florida).—Pelecanus onocrotalus occidentalis, Linn., 1766.—Pelecanus fuscus, of most authors.

Readily distinguished from the White Pelican by the prevailing colors, the naked lower mandible, and 22 tail feathers instead of 24.

Distribution.—Atlantic coast of tropical and subtropical America, north on the Atlantic coast to North Carolina; accidental in Illinois and Michigan.

According to Dr. Morris Gibbs of Kalamazoo, the late W. H. Collins of Detroit wrote him "A specimen taken near Romeo, Michigan in the spring of 1882." Probably this record was considered too doubtful for insertion in Cook's "Birds of Michigan," but we are able now to add two more records which establish the species as a very rare visitor to the state. Dr. J. W. Velie of St. Joseph, Michigan states that "an adult in good plumage was shot at St. Joseph, Michigan, June 7, 1904, and was brought to me in the flesh; I examined, measured, and fully identified it. I have seen thousands of these birds alive, and have shot and skinned numerous specimens in Florida, and there is no possibility of a mistake in this identification. It was not a bird which had escaped from some zoological garden, or at least it showed no signs whatever of recent confinement. The gunners who killed it refused to sell, but took it away and I have been unable to trace the specimen." Dr. Velie also states that "On September 8, 1904, Dr. Crowell of St. Joseph, Michigan saw two Brown Pelicans at the mouth of the St. Joseph River. They passed quite close to him on the wing and he had a good opportunity to note their peculiarities. He has spent several winters in Florida and is perfectly familiar with the species there, and is confident that there is no mistake in the identification."

I can add nothing to the record of this species in Michigan. In general habits it is much like the White Pelican, but appears to be much less of a wanderer.

It nests in large colonies along the Florida shores and the Gulf coast, and lays two or three eggs which are similar to those of the White Pelican, but smaller, averaging 3.01 by 1.95 inches.

TECHNICAL DESCRIPTION.

"Nuptial plumage: Head, and feathers bordering base of gular pouch, all round, white, the top of the former sometimes straw yellowish; rest of neck rich velvety reddish brown, varying from light reddish chestnut to seal-skin brown, or nearly black; upper part of hind neck with a more or less distinct crest of chestnut; upper parts silvery gray, the feathers of back, rump, lesser wing-coverts, etc., edged with dark brown, producing a striped or streaked appearance; lower parts dark brownish gray, the sides, etc., streaked with silvery white. Winter adult: Similar, but whole head and neck white, except for a straw yellow tinge on the former and on the lower part of the fore neck. Young: Head and neck light brownish gray, somewhat mottled with paler tips to the feathers; back, wing-coverts, etc., dull brown, the feathers tipped with pale fulvous; lower parts white, tinged with brownish gray laterally and posteriorly." (Ridgway).

Length, 4 to 4½ feet; wing, 18.50 to 21 inches; culmen, 9.40 to 12.20.

Order V. ANSERES.—Swans, Ducks and Geese.

Family 15. ANATIDÆ.

A. Neck very long, at least as long as the body; tarsus reticulate. Large, entirely white birds. Swans.
AA. Neck shorter than the body. Ducks and Geese. B, BB.
  B. Legs comparatively long and toes short (shank or tarsus longer than the middle toe without its nail); tarsus reticulate. Geese.
  BB. Legs comparatively short and toes long (shank or tarsus shorter than middle toes without its nail); tarsus scutellate in front (Fig. 15). Ducks.

DUCKS.

KEY TO SPECIES.

A. Bill long and narrow (seldom more than ⅓ inch wide at narrowest part never ½ inch wide), edges of both mandibles with saw-like teeth. Saw-bill Ducks. B, BB. (Fig. 10).
  B. Teeth long sharp-pointed, inclined backward; bill long (2 inches or more) wing over 8 inches. Goosander and Red-breasted Merganser. Nos. 30, 31.
  BB. Teeth short, blunt, not inclined backward; bill short (much less than 2 inches); wing under 8 inches. Hooded Merganser. No. 32.

AA. Bill short and broad (never less than ½ inch wide at narrowest place), edges of mandibles with strainer-like plates (Fig. 14) instead of saw-like teeth. C, CC.

C. Tail of narrow, stiff feathers, only its very base hidden by the extremely short upper tail coverts. Ruddy Duck. No. 57.

CC. Tail of ordinary type with broad soft feathers well covered at base by upper tail coverts. D, DD.

D. Hind toe without a distinct flap or lobe (Fig. 15). River and Pond Ducks. E, EE.

E. Small, wing less than 8½ inches (Teal). F, FF.

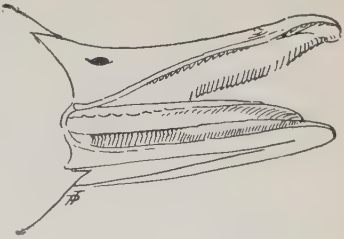

Fig. 14. Bill of Mallard showing lamellæ. (Original)

F. Shoulder (lesser wing-coverts) light blue. Blue-winged Teal. No. 39.

FF. Shoulder (lesser-wing coverts) gray. Green-winged Teal. No. 38.

EE. Large, wing more than 8½ inches. G, GG.

G. Feathers of hind head lengthened to form a drooping occipital crest, much longer in the male; tail long, all its feathers very broad. Wood Duck (male). No. 42.

GG. No occipital crest. H, HH.

H. Middle tail-feathers elongated and much narrowed at the tip. Pintail (male). No. 41.

HH. Middle tail-feathers not noticeably lengthened or narrowed. I, II.

I. Bill spatulate or spoon-shaped, nearly twice as broad near the tip as at base. Shoveller. No. 40.

II. Bill not spatulate, about as wide at base as at tip. J, JJ.

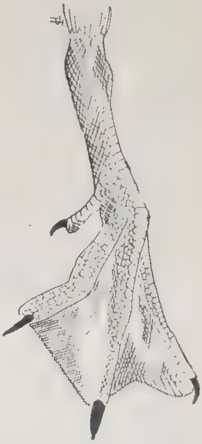

Fig. 15. Foot of Mallard showing hind toe without flap.

J. Wing conspicuously glossed with metallic blue, green, purple or bronze, the tips of primaries metallic blue-green on inner webs, milk-white on outer webs. Wood Duck (female andyoung male). No. 42.

JJ. Wings without metallic gloss, or with metallic colors confined to the middle of wing (region of speculum). K, KK.

K. Speculum metallic in whole or part. L, LL.

L. Speculum bordered in front with a black bar. M, MM, MMM.

M. A white bar in front of the black one. Mallard. No. 33.

MM. A large white patch in front of the black bar. Baldpate. (Male and some females). No. 37.

MMM. No white anywhere on wing. Black Duck. No. 34.

LL. Speculum bordered in front by a chestnut bar. Pintail. (Female and young). No. 41.

KK. Speculum without metallic colors. N, NN.

N. Speculum gray or greenish-gray with a narrow white bar (border) behind. Baldpate. (Female). No. 37.

NN. Speculum with anterior half velvet black, posterior half pure white. Gadwall. No. 35.

DD. Hind toe with a distinct flap or lobe. (Fig. 21.) O, OO.

O. Feathers extending forward along sides or top of bill until nearly or quite even with hind margin of nostril. P, PP.

P. Wing more than 10 inches long. Q, QQ.

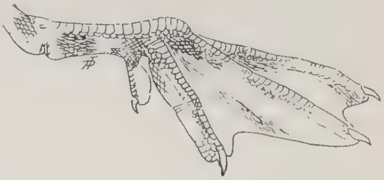

Fig. 21. Foot of Redhead, showing hind toe with flap.

Q. A conspicuous white bar (speculum) on wing.—White-winged Scoter. No. 55.

QQ. No white wing-bar. R, RR.

R. Feathering on sides of bill extending forward nearly or quite even with hind border of nostril. Eider. No. 52.

RR. Feathering on sides of bill not extending forward nearly as far as hind border of nostril. King Eider. No. 53.

PP. Wing less than 10 inches. S, SS.

S. Bird mainly black or brownish black, large, wing more than 9 inches. Surf Scoter. No. 56.

SS. Bird largely white, medium size, wing less than 9 inches. Old Squaw. No. 51.

OO. Feathers at sides or top of bill not reaching nearly to nostril. T, TT.

T. Wing under 7 inches. a, aa.

a. With a conspicuous white wing-bar. Butter-ball; Bufflehead. No. 50.

aa. With no white in the wing. Ruddy Duck. No. 57.

TT. Wing over 7 inches. U, UU, UUU.

U. Speculum wanting (i. e. black or brown like rest of wing). b, bb.

b. Entire plumage black (male) or grayish brown (female) without any white on head or wings. Black Scoter. No. 54.

bb. Plumage largely white, the head and neck always with white patches. Old Squaw. No. 51.

UU. Speculum gray or bluish gray. V, VV.

V. Wing 8 inches or less. Ring-necked Duck. No. 47.

VV. Wing 8½ inches or more. c, cc.

c. Head and neck reddish brown. W, WW.

W. Forehead and chin blackish. Canvasback (male). No. 44.

WW. Forehead and chin red like the rest of head. Redhead (male). No. 43.

cc. Head and neck without any reddish brown. X, XX.

X. Back grayish brown more or less cross-lined or pencilled with white. Canvas-back (female). No. 44.

XX. Back grayish brown without cross-lines or pencillings of white. Red-head (female). No. 43.

UUU. Speculum pure white. Y, YY.

Y. Head mainly black, with blue, violet or green reflections. d, dd.

d. A conspicuous white spot on each side of head. e, ee.

e. White spot round or oval. Whistler (male). No. 48.

ee. White spot more or less triangular (Fig. 24) Barrow's Goldeneye. (male). No. 49.

dd. No white on head. f, ff.

f. Black of head glossed with green, flanks pure white without cross-lines. Greater Blue-bill (male). No. 45.

ff. Black of head glossed with purple, flanks distinctly cross-lined with dusky. Lesser Bluebill (male). No. 46.

YY. Head and neck mainly brown. g, gg.

g. A white face or "mask" formed by feathers about base of upper mandible. h, hh.

h. Larger birds. Greater Bluebill (female). No. 45.

hh. Smaller birds. Lesser Bluebill (female). No. 46.

gg. No white face or mask, but a more or less distinct white ring or collar around lower neck, separating the brown of the neck from the gray chest. i, ii.

i. White collar narrower. Barrow's Goldeneye (female). No. 49.

ii. White collar broader. Whistler. (female). No. 48.

30. Goosander. Mergus americanus (*Cass.*). (129)

Synonyms: American Merganser, Shelldrake, Fish Duck, Big Sawbill, Big Shelldrake. Greater Merganser, Buff-breasted Shelldrake.—Mergus merganser, Wilson, 1814, and most writers.—Mergus americanus, Cass., 1853, Baird, 1858.—Merganser americanus, A. O. U. Check-list, 1895.

In full plumage the male is at once recognized by its dark green head and neck, with short, bushy occipital crest, and under parts white more or less shaded with salmon. The largest of the three species of "saw-billed ducks."

Distribution.—North America generally, breeding south in the United States to Pennsylvania and the mountains of Colorado and California. Bermuda.

Generally distributed throughout the state and not at all uncommon during the migrations. Well known to sportsmen who generally despise the "fish ducks," considering them unfit for food. This bird occurs spring and fall on all the waters of the state, the smaller ponds and streams as well as the shores of the Great Lakes. It nests, at least occasionally, from the Saginaw Valley northward, and Dr. Gibbs states that he has found it once with a brood of young in Kent county. Mr. Edward Arnold informs me that in May, 1905 he found a nest with fourteen eggs at Saginaw Bay, Michigan. Mr. O. B. Warren states that in Marquette county it nests on isolated lakes near Palmer. Major Boies says it breeds on the St. Mary's River at Neebish and elsewhere. S. E. White states that it is not uncommon as a summer resident on Round Island about a mile from Mackinac Island. Mr. Norman A. Wood and others found it breeding along the Lake Superior shore in Ontonagon county and at Isle Royale in the summer of 1894. Mr. Ed Van Winkle says it is abundant and breeds in Delta county. While a majority of the birds go farther south to spend the winter, undoubtedly a few remain wherever open water is found, and Mr. Amos Butler states that on southern Lake Michigan it is one of the commonest ducks during the winter months (Birds of Indiana, 1897, p. 591).

The bird feeds very largely on fish and has been accused of serious injury to food fishes, particularly to trout. It is very doubtful, however, whether it eats many trout, and we know positively that the bird is very fond of crayfish, in which most of our Michigan streams abound. It dives easily and swims with great rapidity below the water.

The nest of this duck is usually placed in hollow trees, or holes in cliffs, although Audubon describes it as on the ground among rushes. In one instance, at least, it was found nesting in a little cave in the edge of a rocky cliff on the shore of Saginaw Bay, and it is probable that it frequently nests in this manner. The eggs vary from ten to sixteen, or possibly more, are buffy white, and average 2.63 by 1.82 inches.

TECHNICAL DESCRIPTION.

Nostrils near middle of bill. The adult male has the head and upper neck greenish-black, the hind head short-crested; lower neck, breast, and belly white or pinkish-white (pale salmon); back black, rump, upper tail-coverts, and tail ashy-gray, wing-coverts with a large white patch crossed by a black bar. The adult female and the young have the chin and upper throat white, rest of head and neck brown or grayish-brown; under parts white.

Length of adult male 25 to 27 inches; wing, 10.50 to 11.25; culmen, 1.90 to 2.20. Length of female 21 to 24 inches; wing, 9.60 to 9.75; culmen, 1.80 to 2.00.

31. Red-breasted Merganser. Mergus serrator (*Linn.*). (130)

Synonyms: Red-breasted Goosander, Red-breasted Shelldrake, Fish Duck, Common Saw-bill.—Mergus or Merganser serrator of most authors.

Figure 10.

The adult male in full plumage is known by the black streaks on the lower neck and sides of chest, and by the long, thin, green occipital crest which is unlike that of either other species of Sawbill. The female has a similar crest which is brown, giving the bird a close resemblance to the female Goosander, which, however, is decidedly larger.

Distribution.—Northern portions of the Northern Hemisphere; south in winter throughout the United States.

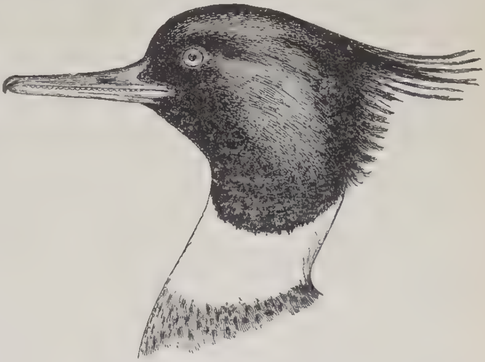

Fig. 10. Red-breasted Merganser.
From Hoffman's Guide to the Birds of New England and Eastern New York. (Houghton, Mifflin & Co.)

Most of what has been said about the preceding species applies also to this, but the Red-breasted Shelldrake in most parts of the state does not seem to be as common at any season as the Goosander. Like the latter it is found on ponds and streams in the interior as well as on the Great Lakes, and it also feeds mainly on fish and crayfish and dives in the same manner as other members of the genus.

Like the Goosander it frequently winters in southern and middle Michigan and this fact makes it difficult to fix accurately the time of arrival and departure of the migrants. Probably the largest numbers move northward early in April and the spring migration is completed by the first of May. Most of the southward migration takes place in October. Even in the Upper Peninsula, however, some linger until December, and Mr. Thomas B. Wyman, of Negaunee, Marquette county, says that it is frequent there along open streams in winter.

In its nesting habits it differs somewhat from the Goosander since, so far as known, it invariably nests on the ground, sometimes under a log or stump, but often under the low spreading branches of an evergreen or even a thick clump of bushes or weeds. So far as I can learn it has not been found nesting in the southern parts of the state, but its eggs have been taken from Saginaw Bay northward; at Mackinac Island and Round Island (S. E. White); near Cross Village, Emmet county and on Beaver Islands (Chas. L. Cass), and near Van's Harbor, Delta county (Van Winkle). At Grand Island, Munising Bay, Lake Superior, Mr. E. A. Doolittle saw a female and seven young but a few days out of the shell, July 6, 1906, and a few days later a combined flock of three broods.

The nests are made of moss, grass and weed stalks, usually heavily lined with down. The eggs are ten or more, cream-colored, and average 2.57 by 1.59 inches.

TECHNICAL DESCRIPTION.

Nostrils near base of bill. Adult male: The whole head and throat dull greenish black, the color strongest on top of the head, duller on the throat; a white collar below the black, below which there is a broad cinnamon-brown band interrupted by black streaks extending over the upper breast and lower neck. Rest of under parts white, the sides and flanks barred with narrow wavy lines of black; the tips of most of the secondaries and the greater coverts white. Rest of upper parts black, more or less barred with white on the rump. Adult female: No black on the head, which is mostly reddish-brown, darker on top and with the chin and upper throat much paler or even pure white; the under parts from lower neck to tail white, the sides washed or barred with ashy-gray; the upper parts darker ashy-gray; the wings darker and the primaries nearly black; speculum white. The young when fully grown resemble the female but are duller.

Length of adult 20 to 25 inches; wing, 8½ to 9 inches; culmen about 2.50; bill from nostril to tip, about 1.75. In any plumage this species can be separated from the Goosander by the position of the nostril, which in the present species is much nearer the base of the bill than in the Goosander.

32. Hooded Merganser. Lophodytes cucullatus (*Linn.*). (131)

Synonyms: Hooded Sheldrake, Summer Sheldrake, Little Fish Duck, Little Saw-bill. —Mergus cucullatus, Linn., 1758, and most of the older writers.—Lophodytes cucullatus of more recent authors.

Figure 11.

Comparison with the figure of the head will identify the male at once, and the female is sufficiently similar. The "saw-bill" and the small size would also separate it from the other fish ducks with which alone it could be confounded.

Distribution.—North America generally, south to Mexico and Cuba, breeding nearly throughout its range. Casual in Europe.

A common migrant throughout the state, and probably breeds much more generally than is suspected. It doubtless nests along most of the streams of the Lower Peninsula, as well as in the northern parts of the state. We have records of eggs or young from Alcona county, Oscoda county, Iosco county, Kent county, Chippewa county, Kalkaska county, and Calhoun county. Wherever it is found in midsummer it may be fairly assumed to be nesting, although as with most ducks the males leave the females after incubation has begun and wander more or less, sometimes alone, more often in company with other males.

The bird nests invariably in the hollow of a tree, often at a considerable height from the ground, and the nest consists of grasses and down from the breast of the mother. The eggs, six to ten in number, are pure white, sometimes nest-stained, and are rounded oval, sometimes almost globular. They average 2.09 by 1.75 inches.

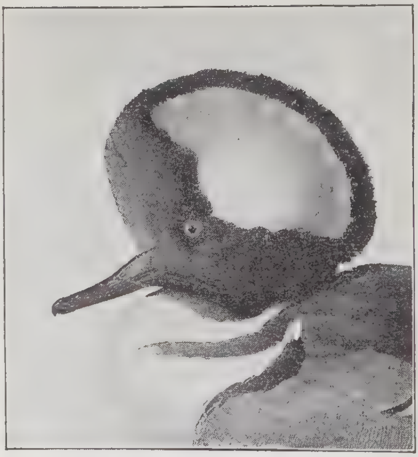

Fig. 11. Hooded Merganser.
(From Bailey's Handbook of Birds of the Western United States. (Houghton, Mifflin & Co.)

In habits this species is similar to other fish ducks, but is more partial to the smaller and more rapid streams where it is believed, probably with more or less reason, to feed on the young of various fishes, including bass and trout. It often remains through the winter wherever open running water furnishes a supply of food. It dives and swims beneath the water with the utmost ease, and its quick motions either in the water or on the wing make it a difficult bird to shoot. Its flesh is much more palatable than that of the other mergansers, being often entirely free from fishy taste. This fact gives color to the statements of some writers that it feeds largely on vegetable food, a question which we have had no opportunity to investigate.

TECHNICAL DESCRIPTION.

In the adult male the larger part of the head and the whole of the neck and throat are deep black, but there is a very long crest of pure white feathers tipped with black, which can be erected so as to form a complete semicircle making the most conspicuous crest worn by any of our ducks. The back is mainly black, the tertiaries and scapulars sharply streaked with pure white. The under parts from lower neck to tail are pure white; the sides and flanks finely barred with black or dark brown on a pale rufous ground. Just in front of the shoulders the black of the back extends downward on the sides of the upper breast forming two conspicuous black horns or points, which however, do not meet in front. These points are bordered in front and behind by a few narrow black and white bars. The wings are dusky; the speculum white. The adult female has the black of the head and neck replaced by reddish-brown of varying depth, with the upper throat white, and with only a small crest which is usually distinctly cinnamon. The lower breast and belly are white; the sides ashy, and the back brownish-black. The fully grown young resemble the female, but have no crest.

Total length of adult, 17 to 19 inches; wing, 7.50 to 7.90; culmen, 1.50.

33. Mallard. Anas platyrhynchos *Linn.* (132)

Synonyms: Common Wild Duck; Green-head (male); Gray Duck and Gray Mallard (female).—Anas boschas, Linn., 1766, and of most authors.

Figures 12 and 13.

In full plumage known at once by its resemblance to the ordinary barnyard duck which is simply the domesticated form of the wild bird. The blue-green or purple speculum, bordered along both edges by black and white, marks the bird in any plumage.

Distribution.—Northern parts of Northern Hemisphere; in America south to Panama and Cuba, breeding southward to southern United States; less common in the east.

This duck is too well known to need any extended description, being probably the most abundant species of duck found in this state. It is one of the best table birds among the water fowl, and is hunted therefore with appropriate ardor.

The Mallard reaches southern Michigan in spring from the first to the 15th of March, the average date being not far from the 10th, and it passes northward as rapidly as the lakes and streams open, affording a safe food supply. In autumn the southward movement begins certainly as early as September 1, although the period of greatest abundance is nearer October 1, and the birds often linger at favorable places until early November, in fact until the first ice forms. We have no winter records of this species, but since it sometimes winters in numbers in northern Ohio, Indiana, and even in southern Wisconsin it is not improbable that it sometimes does so in southern Michigan.

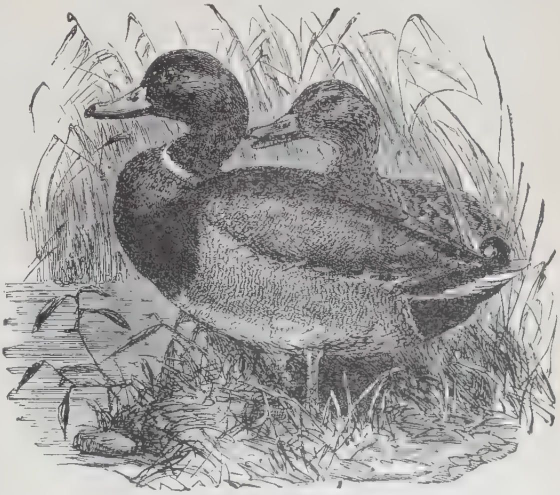

Fig. 12. Mallard.
From Baird, Brewer & Ridgway's Water Birds of North America. (Little, Brown & Co.)

This is a typical marsh or shallow water duck, getting its food by "dabbling" and wading, or frequently by walking about on the shore. It does not dive for its food, and in fact even when wounded seldom attempts to escape by diving. It often visits stubble fields and meadows at long distances from water, going out to feed late in the afternoon and returning early in the morning, sometimes affording good "pass shooting" at such times. It is hunted most commonly by the use of decoys, either living domesticated mallards or wooden imitations, anchored near a blind, the gunner sometimes using a duck call as an additional attraction. In many places where clubs or private individuals have shooting grounds which can be protected the Mallards and some other ducks are regularly baited with grain strewed in the shallow water. Wild rice is also extensively planted for the same purpose.

It formerly bred in suitable places everywhere in the state, nesting on the ground in or near marshes, or on islands in marshy ponds. Persecution has driven it away from many localities where it formerly nested in abundance and it is now known in many parts of the state mainly as a migrant.

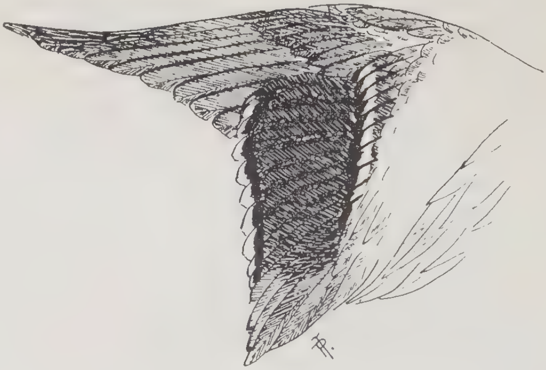

Fig. 13. Wing of mallard, to show speculum. (Original.)

It breeds rather early, and most eggs probably are laid in May, the ducklings being most commonly seen in early June. The nests are hollows in the ground lined with grass and other dry vegetable matter with a good deal of gray down from the bird's breast. The eggs range from eight to fifteen, are greenish or grayish buff, and average 2.32 by 1.67 inches. The mother is said to be very brave in defence of the eggs or young, not only trying to decoy the intruder away but in some cases threatening or even attacking man or dog.

TECHNICAL DESCRIPTION.

In the adult male the head and neck are rich green, bordered below by a white collar, with clear chestnut below the white. The speculum is metallic blue or purple bordered all around by black, and with a white bar outside the black both in front and behind. The under parts are grayish white vermiculated with black, and the under tail-coverts are deep black in strong contrast. The adult female is a totally different looking bird, the only strong similarity to the male being in the wings where the speculum is nearly the same. The remainder of the plumage is brown and black in streaks and mottlings, darker above and lighter below. The adult male frequently has several of the upper tail-coverts curled upward, but this is by no means always the case. Bill greenish; legs and feet, reddish-orange. The drake cannot be confounded with any other; the female and young might be taken for those of the dusky duck or black duck. Length of adult, 22 to 25 inches; wing, 10 to 12; culmen, 2 to 2.40.

34. Black Duck. Anas rubripes *Brewst.* (133)

Synonyms: Black Mallard, Dusky Duck, Dusky Mallard, Red-legged Duck.—Anas obscura rubripes, Brewster, 1902.—Anas obscura, Gmel., 1788, and of most authors.

It may be recognized by its general brownish black color, violet speculum tipped with black but without the white bands characteristic of the Mallard wing.

Distribution.—Eastern North America, west to the Mississippi Valley, north to Labrador, breeding southward to the northern parts of the United States.

The Black Duck is similar in appearance and voice to the common Mallard, for the female of which it is sometimes mistaken. It is not uncommon throughout the state during the migrations, and doubtless formerly bred in suitable places everywhere.

It arrives from the south from three weeks to a month later than the Mallard, an average date for the southern counties being not far from April 10th. On the other hand its autumnal movement southward does not begin until late in September, and numbers linger until after most of the Mallards have gone. According to Swales it is occasionally found at St. Clair Flats in winter, although very likely these birds may prove to belong to the more northern form, the Red-legged Duck. At present it seems to be only a migrant in the southern part of the Lower Peninsula, but breeds sparingly throughout the remainder of the state. It is found commonly in large flocks, flies and feeds much after dark, and is considered just as good eating as the Mallard. The nest is placed on the ground not far from the water, built of grasses and similar coarse materials, and more or less heavily lined with down. The eggs are grayish white to greenish buff, and average 2.43 by 1.75 inches.

TECHNICAL DESCRIPTION.

Resembles the Mallard in size and general appearance and might readily be mistaken for the female or young of the year of that species. The sexes, however, are alike, and in any plumage the Dusky Duck is always darker and less streaked than the Mallard. The general color is a rich dark brown, the feathers usually with lighter edgings. The lower back and rump are sometimes glossy black, but elsewhere the plumage is seldom darker than a clear brownish-black. The head is deep brownish-black on top more or less mixed with narrow streaks of ashy or brownish; the sides of the head, the throat, and the neck all around are buffy white finely streaked with fuscous. The distinguishing mark of the species is the speculum, which is deeper blue or violet-purple than in the Mallard, bordered in front and behind by black, sometimes with a narrow white bar behind the black, but none on the front edge. Bill greenish-black to olive-green; legs and feet brownish or sometimes tinged with reddish.

Length, 21 to 24.50 inches; wing, 10.50 to 11.50; culmen, 2 to 2.35.

In the northern form, separated as a subspecies by Brewster in 1902 under the name Red-legged Black Duck, the tarsi and toes are bright red and the bill yellow, while such individuals average somewhat larger than those reared farther south. According to Mr. Brewster the Red-legged form does not appear in New England as a rule before the middle of October, his earliest record with a single exception being. October 8. He is careful, however, to make it clear that by no means all the black ducks which nest north of the United States belong to the Red-legged form, Mr. C. F. Batchelder having collected many examples of the smaller bird in Newfoundland in June and July.

The colors of the bill and feet change very quickly after death so that in museum specimens or dried skins the colors of these parts in the two forms are not noticeably different. Mr. Brewster, however, states that the two birds "are sufficiently unlike in respect to size and proportions, as well as in coloring, to be distinguished, under favorable conditions, at more than gunshot distance when flying, and when freshly killed and placed side by side they may be separated at a glance. The larger bird usually has the entire bill (excepting the nail) yellow, varying from chrome to canary or sulphur yellow, the legs and toes bright red, varying from light scarlet to deep orange, the dark feathers of the pileum and nape conspicuously margined with gray or fulvous and the throat (as well as sometimes the chin, also) profusely spotted or streaked with blackish. All the dark markings on the cheeks, throat and neck are broader, blacker and more sharply defined [than in the southern form] and they often take the form of coarse, rounded spots which are seldom if ever present on the head or neck of the smaller bird. In typical examples [of the smaller form] the bill is greenish black, dusky olive, or olive green, the legs are olivaceous brown with, at most, only a tinge of reddish, the pileum and nape are nearly or quite uniformly dark, the throat and chin immaculate, the markings on the neck and sides of the head fine, linear, and dusky rather than blackish." (Auk, Vol. 19, 1902, pp. 184, 185).

35. Gadwall. Chaulelasmus streperus (*Linn.*). (135)

Synonyms: Gray Duck, Gray Widgeon.—Anas strepera, Linn., 1758.—Chaulelasmus streperus of most authors.

Figure 16

The male is easily recognized by its chestnut middle wing-coverts and the white speculum bordered in front by black. The female has the same speculum, but usually no chestnut on the wings and can hardly be identified by the novice.

Distribution.—Nearly cosmopolitan. In North America breeds chiefly within the United States.

This seems to be one of the rarer ducks in Michigan; it has been taken here and there throughout the state, but is nowhere common. In southern Michigan Purdy has taken one at Plymouth; Swales reports an adult female killed on Monroe Marshes October 26, 1906, and a young male and female at the same place about November 13; Warren records it as rare at Albion and occasional at St. Joseph. Most of the older lists have it, but it is omitted by Cabot (1850). I have no record for it for Ingham or the adjoining counties and it must be rare here.

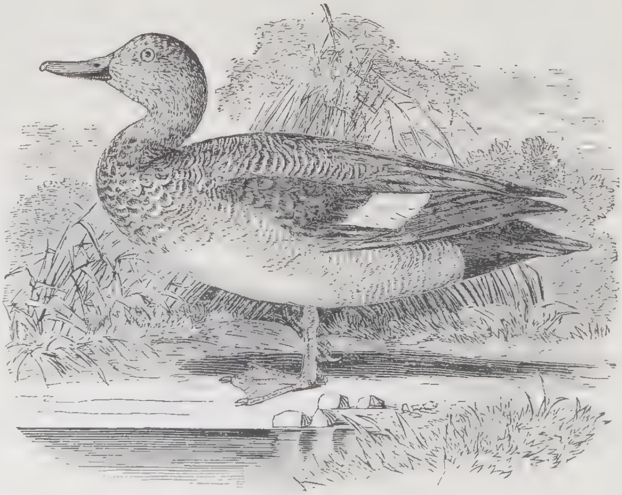

Fig. 16. Gadwall.
From Baird, Brewer & Ridgway's Water Birds of North America.
Little Brown & Co.

We have no record of its nesting in the state yet there is no reason why it should not do so occasionally, and it probably does. Mr. A. C. Bent (Auk, XVIII, 334-35) says that in North Dakota, where the species is fairly abundant, it nests always on dry ground, but not far from the water.

The nest is merely a hollow in the ground padded with grass and weed stems and profusely lined with dark gray down around the eggs. These are dull creamy white, whiter and less creamy than the Baldpate's, also shorter and rounder. Mr. Bent found from seven to eleven eggs in a set, and seven nests with eggs were found July 15, 1901. The eggs average 2.09 by 1.57 inches.

In its general habits it resembles the Mallard, frequenting the smaller streams, the edges of ponds and rivers, and the sloughs and pools of marshes, where it feeds on grasses and the leaves of various water plants, as well as on their roots and bulbs, and probably also on snails and other small animals, including insects. It never dives for its food, but secures it by "tilting" or "standing on its head" in shallow water, or by wading along the shore or waddling about on dry land. On the prairie sloughs of the northwest where it is more abundant, it flies in moderate or small flocks, but with us it is found singly or in squads of three or four, single Gadwalls being most often seen in company with Pintails or Baldpates. We have no data on its migration in Michigan, but the records for neighboring states indicate that it is likely to reach us from the south during the latter half of March, passing northward during April and returning in October.

TECHNICAL DESCRIPTION.

A large duck, similar in general appearance to the Mallard and Black Duck. but slightly smaller. The adult male has the top of the head brown or brownish-white thickly streaked and spotted with black, the top of the head with the ground color brownest and the streaks nearly wanting; the sides of the head similar but paler. The lower neck all around and the breast black, each feather with a white border and a ring or crescent of white which gives the plumage a peculiar and unmistakable appearance. The belly is pale gray or white, with the under tail-coverts velvet black in sharp contrast. The upper parts are brownish-slate, the rump and upper tail-coverts black. The lesser-wing-coverts are chestnut-brown, a distinctive feature; speculum pure white with a broad velvet black patch in front. The adult female has the head and throat similar to those parts in the male, but the breast and sides buffy spotted with black and with the peculiar scale-like markings less distinct than in the other sex; the lesser wing-coverts also commonly lack the chestnut.

Length of male, 19.25 to 21.75 inches; wing, 10.25 to 11, culmen, 1.60 to 1.75. Female: Length about 18 inches, wing, 10 to 10.25, culmen 1.55 to 1.65.

36. European Widgeon. Mareca penelope *Linn.* (136)

Synonyms: Widgeon.—Anas penelope, Linn., 1758.

The male in adult plumage resembles the American Widgeon or Baldpate except that most of the head and neck are rich reddish brown, the chin and throat blackish. It is not likely that the two species would be discriminated at gun shot range.

Distribution.—Northern parts of the Old World. In North America breeds on the Aleutian Islands, and occurs frequently in the eastern United States and occasionally in California.

Perhaps a dozen specimens have been recorded in the eastern United States in the last twenty years, and of these four at least have been taken in Michigan. There is a nice mounted specimen in the collection of the Monroe Marsh Club, Monroe, Michigan, killed there by Robert Lawrence of New York City, probably about 1898. The writer examined this specimen in March, 1905. Mr. Harold Herrick records one (Auk, XIX, 284) taken at Monroe, March 27, 1902 by William B. Boulton. He also states that another male in good plumage was taken in April, 1900, and a third in April 1892. Mr. Herrick believes that females are also taken occasionally, but owing to their close resemblance to the female of the Baldpate they are not recognized.

TECHNICAL DESCRIPTION.

The adult male agrees with the Baldpate in having the "forehead and fore part of crown, posterior half of middle wing-covert region, and belly, plain white; speculum metallic green anteriorly, velvety black posteriorly; crop plain vinaceous; sides, flanks scapulars, and back, delicately waved with dusky upon a paler ground; under tail-coverts plain black." In addition the adult male in winter and spring has "Head and upper neck plain rufous, the forehead varying from white to ochraceous; crop and sides of breast vinaceous; sides, flanks, and whole back white, waved with blackish" (Ridgway). Females, males after the breeding season, and young of both sexes are likely to be mistaken for similar sexes and ages of the Baldpate, and can be positively identified only by the expert who has proper material for comparison.

Length, 18 to 20 inches; wing, 10 to 11; culmen, 1.35 to 1.45.

37. Baldpate. Mareca americana (*Gmel.*). (137)

Synonyms: Widgeon, American Widgeon, Green-headed Widgeon, Bald Widgeon, Poacher.—Anas americana, Gmel., 1789, and many authors.—Mareca americana, Steph., 1824, and authors generally.

Figure 17.

Adult male recognizable most easily by the large amount of white on the wings (most of the coverts), the green speculum bordered behind by velvet black, and the broad patch of metallic green on the side of the head behind the eye.

Distribution.—North America, from the Arctic Ocean south, in winter to Guatemala and Cuba. Breeds chiefly north of the United States, and west of the Mississippi.

Apparently not a common duck in this state. It is found sparingly during migration, but we find no evidence that it nests here. Probably it never winters within our limits, but arrives from the south late in March and passes north of our boundaries during April, returning late in September and lingering until November, or even December. It is usually found in small flocks, a dozen or less, but associates freely with other species and has earned the name of Poacher by its habit of keeping with the Canvasbacks and Redheads when they are feeding in deep water and stealing from them a considerable part of the succulent grasses, waterweeds and roots which they bring to the surface. It is particularly wary and suspicious, and much disliked by gunners because it not only protects itself but gives the alarm to less watchful ducks of other species. It does not decoy readily, does not dive except when wounded, and when travelling usually flies in "company front" instead of single file.

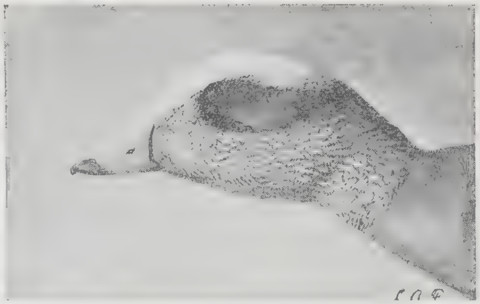

Fig. 17. Baldpate.
From Bailey's Handbook of Birds of the Western United States. (Houghton, Mifflin & Co.)

Some of the earlier lists gave it as nesting, but this probably is a mistake. It is known to breed throughout most of northern British America, even to the Arctic Circle, but the southernmost point where it now nests abundantly seems to be the Devil's Lake region of North Dakota. According to A. C. Bent (Auk, XVIII, 335-36) it is a late breeder there, very few eggs being found before June 1. On June 15 he found twelve nests in a single half hour. All were placed on dry ground, in slight hollows, lined with grasses, weeds and an abundance of gray down, with which the eggs are completely covered when the mother leaves the nest. The eggs are from eight to twelve and vary from almost white to deep cream color. They average 2.06 by 1.48 inches.

TECHNICAL DESCRIPTION.

Adult male in full plumage with the forehead and crown pure white or creamy white, the sides of the head above and back of the eye glossy green, this color extending to and including the nape. Ordinarily both the white of the crown and the green of the head are more or less spotted and streaked, the former with black, the latter with white. The remainder of the head and neck is gray due to rather coarse spotting and streaking with black on the white ground color. The upper breast and sides are pinkish-brown ("vinaceous") without streaks or spots, but the feathers often with ashy edgings. Lower breast and belly pure white; under tail-coverts velvet black in sharp contrast. Back, scapulars and rump finely barred (vermiculated) with black and slate or buff, some of the scapulars with black shaft streaks. The speculum shows a narrow green area surrounded by dull black, with a large white patch in front. The shoulders (lesser wing-coverts) are pale ashy-brown; the tertiaries lanceolate, much lengthened, the outer webs glossy black margined with pure white. The female is difficult to describe, but may commonly be recognized by the combination of a finely streaked head and neck with pinkish-brown breast and sides and the lanceolate, streaked tertiaries. She does not ordinarily show any trace of green about the head, or of pure white on forehead and crown.

Length 18 to 22 inches, wing 10.25 to 11, culmen 1.30 to 1.50.

38. Green-winged Teal. Nettion carolinense (*Gmel.*). (139)

Synonyms: Green-wing, Winter Teal, Red-headed Teal.—Anas carolinensis, Gmel., 1789.—Querquedula carolinensis, Steph., 1824.—Nettion carolinensis of most recent authors.

The bright cinnamon head with a large metallic green patch on each side is characteristic of the adult male. In any plumage the small size separates it from everything but the Blue-winged Teal, and the absence of the pale blue shoulder excludes that.

Distribution.—North America, breeding chiefly north of the United States, and migrating south to Honduras and Cuba.

The Green-winged Teal at present is not a common bird in any part of the state. It occurs sparingly in early spring (March 15 to April 30), and lingers in the fall at least until ice begins to form (Nov. 20 to Dec. 15). We have little reason to believe that it nests within our limits now, although it probably did so sparingly in years gone by. Major Boies records it as nesting on Neebish Island between 1892 and 1894. Its normal breeding grounds are well to the north of Michigan. The nest is placed on the ground, not necessarily close to water, and the eggs vary in number from eight to eighteen. They are white or buffy white, and average 1.75 by 1.28 inches.

Except while nesting the birds are commonly seen in compact flocks, often of large size. They feed freely on seeds, grasses and other vegetable matter, but also eat insects and other animal food. Where they have been much disturbed they feed freely at night, resting during the day on open stretches of water where they are comparatively safe. They dive readily when necessity requires it, but seldom in search of food, the larger part of their food being found in shallow water, along shore or on the marshes and mud flats.

TECHNICAL DESCRIPTION.

Adult male with chin dusky or black, a large patch of metallic green on each side of head including the eye and extending back to the nape where the two patches join and the feathers are elongated into a crest; rest of head, upper throat, and neck bright cinnamon brown. Sides and upper back finely vermiculated with black and white; breast pinkish-brown (vinaceous) spotted with black; a conspicuous white bar or crescent on the side of the breast just in front of the bend of the wing; under tail-coverts buffy white at the sides, black in the middle. Speculum metallic green and velvet black in about equal parts, margined in front with clear pale brown and behind with pure white. Adult female similar only as to wings. The rest of the bird mainly slaty brown above, many of the feathers with ashy margins, the brown darkest on top of the head; the breast and sides buffy white, each feather with a large spot of brown; the chin, belly, and lower tail-coverts, white and unspotted; sides of breast and neck finely streaked with dusky-brown on a nearly white ground color. Young of the year resemble the female.

Length 12.50 to 15 inches; wing 6.25 to 7.40; culmen 1.40 to 1.60.

39. Blue-winged Teal. Querquedula discors (*Linn.*). (140)

Synonyms: Blue-wing, Summer Teal.—Anas discors, Linn., 1766.—Cyanopterus discors, Eyt., 1838.—Pterocyanea discors, Bonap., 1856.—Querquedula discors of authors generally.

The adult male is instantly recognized by the large pure white crescent (like a new moon) on each side of the head between the eye and bill; adults of either sex have most of the shoulder (lesser wing-coverts and scapulars) light blue; the small size separates it from anything but the Green-winged Teal.

Distribution.—North America in general, but chiefly eastward; north to Alaska, and south to the West Indies, Lower California, and northern South America. Casual in California. Breeds from Kansas and southern Illinois northward.

Probably the Blue-winged Teal is the most abundant summer duck found in Michigan and formerly it bred commonly all over the state. It still breeds in suitable localities, but much less frequently than formerly. It is later in arriving in spring than most of our ducks, seldom reaching the southern counties before the first of April, while it is one of the earliest of all to move southward in autumn, the movement beginning by September 1 and being practically competed during that month. Its abundance, the ease with which it decoys, and its good table qualities insure constant persecution during the open season.

While with us it shows a marked preference for marshes, grassy ponds and sluggish streams, and is particularly partial to regions where wild rice (Zizania) grows. It is rarely seen singly or in pairs, but almost always in flocks of a dozen or more, sometimes more than fifty being found together. It is neither shy nor suspicious and hence is more frequently bagged by the amateur than any other duck.

The nest, placed on the ground in meadows or prairies, is formed of grass and lined with down. The eggs are from eight to twelve, white or buffy white, and average 1.84 by 1.34 inches.

Our nesting records are Hillsdale (Munson); mouth of Kalamazoo

River (S. E. White); Chandler's Marsh, Ingham county, (numerous records); Ann Arbor (Covert); Monroe county, eggs taken June 15, 1890 (Trombley); St. Clair Flats (Swales); Neebish Island, St. Mary's River (Boies); Wayne county, (Purdy).

TECHNICAL DESCRIPTION.

Adult male with chin, face, and crown brownish-black, darkest on the crown; a conspicuous crescent of pure white on each side of head in front of the eye, the upper horn ending directly above the eye, the lower horn nearly meeting its fellow on the throat; rest of the head and most of the neck clear bluish ash with a purplish gloss; lower neck and entire breast, sides and belly pinkish brown, each feather with a distinct rounded spot; upper back ashy-brown, each feather margined with buffy-white; scapulars brownish-black with sharp shaft-stripes of light buff; lower back and rump ashy-brown, unspotted; lower tail-coverts velvet-black in sharp contrast with the spotted belly; a large white patch on each side of the base of the tail. Speculum green, bordered in front by a white bar; entire shoulder in front of this bar light blue. Female similar as to the wings, but speculum merely greenish with only a narrow line of white in front; chin and upper throat buffy-white, unspotted; remainder of under parts buffy or brownish-white everywhere, the feathers streaked or spotted with brown or black; crown dark brown with a few pale streaks; scapulars, back, rump and upper tail-coverts brownish black, each feather distinctly edged with buffy-white.

Length 14.50 to 16 inches; wing 7 to 7.50; culmen 1.40 to 1.65.

The male in late summer and the young of the year resemble the adult female except that the adult male always shows the characteristic speculum.

40. Shoveller. Spatula clypeata (*Linn.*). (142)

Synonyms: Spoon-bill, Red-breasted Shoveller, Blue-winged Shoveller, Shovel-bill. —Anas clypeata, Linn., 1758.—Spatula clypeata, Boie, 1822, and most recent authors.

Adults of either sex may be known at once by the size and light blue wing-coverts; the much smaller Blue-winged Teal being the only species with a similar shoulder. The blue is gray-blue or wanting in young birds. The spoon-like bill of course is distinctive at any age.

Distribution.—Northern Hemisphere. In North America breeding from Alaska to Texas; not abundant on the Atlantic coast north of the Carolinas.

Contrary to what might be inferred from the books this is nowhere a common duck in Michigan. Our reports come mainly from the St. Clair Flats and Saginaw Bay, but it has been noted here and there all over the state. According to Swales, in southeastern Michigan it is a fairly common migrant, has been taken at Plymouth, Wayne county, by Purdy, and Morden and Saunders say "It may breed at the Flats" (Swales). We have records from Kalamazoo county, Ingham county, Kent county, and St. Clair county, in addition to those already given, but I do not find a single definite nesting record, although several observers state that "It is a summer resident," and Langille says the nest is "rarely found" at St. Clair Flats (Bull. Buffalo Soc. Nat. Hist. V, 1877, 36). According to A. C. Bent (Auk, XIX, 3, 4) it is one of the commonest ducks in North Dakota, nesting abundantly. The nest is a slight hollow in the ground scantily lined with down, and the eggs are similar to those of the Mallard and Pintail, very pale olive buff or greenish gray. The nests are often placed away from water on the open prairie, and sets are seldom complete before June 15. The eggs average 2.12 by 1.48 inches. It may be looked for in spring from about the first of April until the second week in May, and its southward flight begins about September 1 and may last until the middle or end of October.

It frequents the same feeding grounds as the Mallard and uses to great advantage its large bill with its highly developed lamellæ, by means of which it sifts out of the mud and water any and everything eatable. Its flesh is said to be of the very best.

According to D. G. Elliot "When about the marshes, or moving over the inland lakes and coasting along the shores, the Spoonbill is readily recognized by its flight, which is more like that of a teal, although much less swift, and is performed in an irregular, hesitating kind of way, as if the bird was uncertain just where to go. * * * It is not particularly timid, and will often come boldly up to decoys. * * * I have seldom heard it utter any sound, though occasionally it gives forth a few feeble quacks, but it is usually very silent."

TECHNICAL DESCRIPTION.

Adult male with head and neck all around dull metallic-green with purplish reflections, the chin, forehead and crown likely to be more brownish and with less metallic color; entire breast, base of neck and scapulars snowy-white, the inner scapulars and back brownish-black; rump black; entire belly rich chestnut; under tail-coverts velvet black separated from the chestnut belly by a band of finely barred black and white feathers; a large patch of white near root of tail on each side bordered posteriorly by a patch of metallic-green; speculum rich metallic-green bordered in front by a broad white band; entire shoulders clear pale blue.

Adult female similar to the male only as regards the wings, and in these the colors are not so strong. Upper parts grayish brown variously mottled and streaked; under parts brownish-white, the neck streaked and the breast and belly spotted with brown. The young of the year are similar to the adult females, but the pale blue of the shoulders is duller or altogether wanting and the speculum has little or no green.

Length 17 to 21 inches; wing 9 to 10; culmen 2.60 to 2.90; width at end 1.10 to 1.20. where it is nearly twice as wide as at the nostrils.

41. Pintail. Dafila acuta (*Linn.*). (143)

Synonyms: Spring-tail, Sprig-tail, Spike-tail, Sharp-tail, Pigeon-tail.—Anas acuta, Linn., 1758.—Dafila caudacuta, Steph., 1824.—Dafila acuta, Gray, 1844, and most recent authors.

The long middle tail-feathers are characteristic of the adult male and the cinnamon wing-bar is a distinctive mark in any plumage.

Distribution.—Northern Hemisphere. In North America breeds from the northern parts of the United States northward, and migrates south to Panama and Cuba.

A rather common migrant in Michigan and one of the earliest ducks to come north in the spring (southern Michigan March 15 to 20; returning southward August 20 to last of October). P. A. Taverner writes "Saunders records it breeding on the St. Clair Flats, but I can find no verification beyond his record published in 1882." Swales (MS. list 1904) says of southeastern Michigan "A common migrant spring and fall, March and April, again October and November. Purdy has seen it at Plymouth. Saunders writes me that he has taken a nest at Rondeau, Lake Erie, and has seen the birds in summer at St. Clair Flats one year, hence the inference in Macoun and McIlwraith that they breed there. I have never heard of this bird being seen after May first."

Positive proof of the nesting of this species within our limits was obtained by Norman A. Wood during the past summer (1911), at the Charity Islands, near the mouth of Saginaw Bay. Mr. Wood took two young Pintails still unable to fly, and one of the light-keepers on the island remembered seeing the parent bird in early summer and searching for the nest in vain.

The normal nesting grounds of this species are in the far north, and it is known to breed from northern Minnesota to the Arctic Circle. "In North Dakota it is an early breeder, beginning to lay early in May; probably the majority of the broods are hatched by the first week in June. The female is strongly devoted to the young, trying to decoy the intruder away. It nests anywhere, often a half mile from water; the nest poorly concealed, often in plain sight, a deep hollow in the ground, lined with straw, stubble and a little down. Eggs eight to ten, much like the Mallard's, but smaller and more glossy, pale olive green or olive buff." (A. C. Bent, Auk XIX, 5-6). Ridgway gives the average size of the eggs as 2.21 by 1.47 inches.

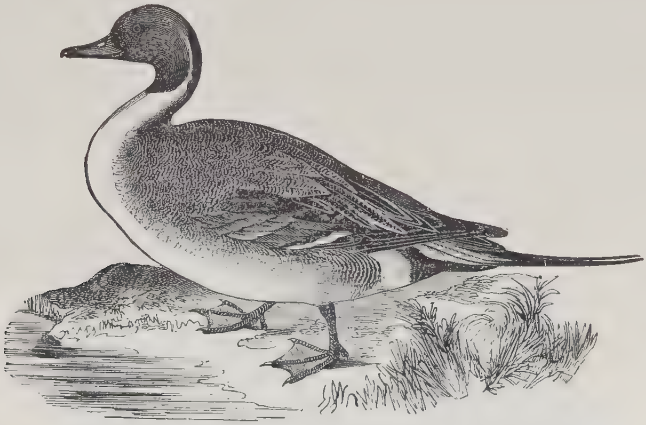

Fig. 18. Pintail—Male.
From Baird, Brewer & Ridgway's Water Birds of North America. (Little, Brown & Co.)

On the water as well as on the wing the Pintail is easily recognized by its long neck. According to D. G. Elliot it has three common notes; a mellow whistle, a hoarse, guttural quack, and a rolling note similar to that uttered by the Lesser Scaup. He adds "As a diver the Sprigtail is only a partial success. It can go under water, though it cannot stay long, but it skulks with great skill, stretching out the neck to the fullest extent and laying it and the head flat upon the surface. At a little distance, unless there is a complete calm, it is very difficult to be seen when it assumes such a position."

TECHNICAL DESCRIPTION.

Adult male in full plumage with top of head very dark brown, sometimes nearly black; sides of head and throat clear brown, with a greenish gloss posteriorly. The brown of the crown passes into jet black on the occiput, nape and upper hind neck, where it forms a narrow stripe passing down the back of the neck, becoming grayer and finally blending with the vermiculated back. On the hind head and upper neck this stripe is bordered on each side by pure white, which is an extension of the white of the lower neck, breast and belly. The back and sides are beautifully vermiculated with narrow black and white wavy lines; the tertiaries and some of the scapulars are elongated and lanceolate, and have broad black shaft stripes in sharp contrast with the clear as of the rest of the vanes. The speculum is green, edged posteriorly with pure white and in front by a bar of cinnamon-brown (distinctive). The under tail-coverts are velvet black in strong contrast with the white belly, and the middle tail-feathers are often very much elongated and taper to sharp points. The female is much smaller than the male, never has the clear brown and pure white head markings, nor the finely barred back and sides; she is usually a brown-streaked or gray-streaked, inconspicuous looking duck, but may generally be recognized by the elongated, sharp middle tail feathers which do not occur in any of our other ducks.

Length of male 26 to 30 inches; wing 10.25 to 11.20; middle tail feathers 7.25 to 9.50; culmen 1.85 to 2.15. Length of female 21 to 23.50; wing 9.60 to 10.10; middle tail feathers 4.50 to 5; culmen 1.80 to 2.10.

42. Wood Duck. Aix sponsa (*Linn.*). (144)

Synonyms: Summer Duck, Acorn Duck, Wood Widgeon (Conn.).—Anas sponsa, Linn., 1758.—Aix sponsa, Boie, 1826, and most authors.

Figures 19 and 20.

In any plumage the long tail of soft, broad feathers is characteristic, and some of the wing feathers (primaries and secondaries) show a metallic sheen and frosted edgings or tips.

Distribution.—Temperate North America, breeding throughout its range. Cuba.

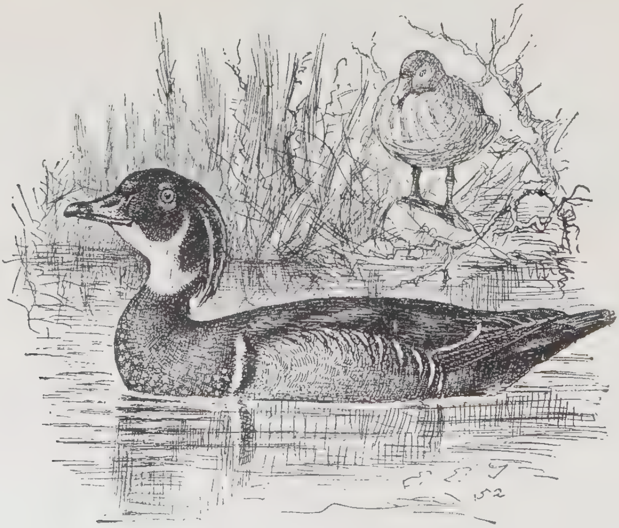

Fig. 19. Wood Duck—Male.
From Nuttall's Ornithology. (Little, Brown & Co.)

This doubtless is the most beautiful of American ducks, and the male in full plumage is probably without a superior in any part of the world. Unfortunately it is one of the species which appears to be rapidly decreasing in numbers throughout the state, and probably throughout the country at large. Twenty years ago it was one of the most abundant ducks in the state and nested commonly in the hollow trees bordering most of our streams and ponds. Its present status is best shown perhaps by a few notes from observers in different parts of the state. O. B. Warren, Marquette county, 1898, says "Uncommon; when it occurs it stays to breed." Hazelwood, Port Huron, 1904, "Very common years ago." Swales, southeastern Michigan, 1904, "Now a rare bird but was formerly a common migrant and fairly abundant summer resident. A few pairs are said to breed still on the inland lakes in Oakland county. I have seen two or three near Waterford in August. At the Flats it is occasionally taken in April and October, and also in the marshes near Monroe and Pt. Mouille." P. A. Taverner, Macomb county "Once common, now rare; one bird, male, taken this fall on the Flats." Boies, Neebish Island, 1891-93, "People on the island tell me that they have found their nests often during the summer, but I saw neither. They were plenty in the fall, however." Purdy, Plymouth, 1904, "Formerly quite common, but now very rare. It used to breed here, but now rarely visits our ponds and streams." Dunham, Kalkaska county, 1904, "Rather rare; a few breed along the Manistee River." Swales, St. Clair county, 1904, "Very rare now; once a common summer resident." Van Winkle, Delta county, 1905, "Quite common, breeds.

It reaches the southern counties during the latter part of March, and moves southward again during September and October, the latest dates being about November first.

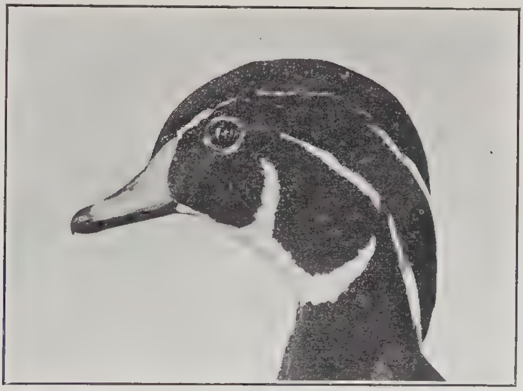

Fig. 20. Wood Duck.—Male.
From photograph of mounted bird. (Original.)

The nest is always placed in the natural hollow of a tree, which may be living or dead, and the entrance is often forty or fifty feet above the ground. Mr. Covert states that 19 eggs were taken from a nest at Bass Lake, Washtenaw county, April 30, 1897, by Dean C. Worcester and F. G. Bournes.

This species seems to be an early nester and it is probable that the above date represents about the average time for the completion of the set. The number of eggs, however, seems abnormal, the usual number being from eight to fifteen. The nest often contains much down, and the eggs are white or buffy white and average 2.08 by 1.58 inches.

This duck is a general feeder, but is particularly fond of acorns, and spends much of its time in October along wooded streams and about the margins of ponds where these can be had. While sometimes found in the open lake and in large ponds it is far more frequently seen along the smaller streams which wind slowly between heavily wooded banks, especially if there is much oak timber in the vicinity. It does not, however, disdain the ordinary food of other ducks, and is frequently found in the wild rice swamps and grassy marshes with Mallards, Teal, and other marsh-loving species.

TECHNICAL DESCRIPTION.

Adult male: Head mainly metallic green and purple above and pure white below, with a long, full occipital crest of the same colors. Chin and throat pure white extending upward and backward in two pairs of crescents, the anterior ending back of the eyes, the posterior nearly meeting on the back of neck beneath crest. A narrow white line on either side, starting from the forehead, runs backward over the eye and to tip of crest, while a broader white line starts behind the eye and also terminates in the crest. A black collar separates the white throat from the chest, which is rich purplish chestnut, marked with triangular white spots, very small in front but increasing in size toward the breast and belly, which are white and unspotted. A vertical white bar on each side of the breast, bordered behind by a velvet black bar of equal or greater width. Sides and flanks finely cross-lined with black on a yellowish ground color, the hindmost flank feathers beautifully banded with crescent-like bars of black and white. Upper parts, including wings and tail greenish-black or brownish-black, with metallic reflections of green, purple and bronze; speculum metallic blue-green with a white bar behind; primaries frosted with white on outer edge and tipped with metallic blue-green. Sides of base of tail purplish chestnut.

Adult female: Similar as to wings and tail but without crest and lacking the purplish chestnut of lower parts and the cross-lined flanks. The chin and belly are white as also a ring around the eye and stripe behind it. Rest of head and neck gray; chest mottled and streaked with yellowish-white and brown. Young resembling the female at first, but the young males soon showing signs of the characteristic throat-patch and crest.

Length of male 19 to 20.50 inches; wing 9 to 9.50; culmen 1.40. Female slightly smaller.

43. Redhead. Marila americana (*Eyton*). (146)

Synonyms: Pochard, American Pochard, Raft Duck.—Anas ferina, Wils., 1814.—Fuligula ferina, Bonap., 1828.—Aythyaferina var. americana, Allen, 1872.—Aethyia americana, B. B. and R., 1884.—Fuligula americana, Eyton, 1838.

The adult male can be confounded with nothing but the Canvasback, from which it is easily separated by the shape of the bill and the clear red head without any black. The "canvas" pattern of the back moreover, is made of black and white cross lines of about equal width, while in the Canvasback the light lines are wider than the black ones. The females and young of the year are not readily separated except by the characters of the bill.

Distribution.—North America, breeding from California, southern Michigan(?), and Maine northward.

The Redhead is well known to sportsmen throughout the state, but is abundant only during the migrations, and then mainly near the Great Lakes, and particularly along the east side of the state. It does occur sometimes on the smaller inland lakes, but, barring the accident of heavy storms, its movements are governed largely by the abundance of food. It is hunted extensively along Saginaw Bay, St. Clair Flats, Detroit River, and the Monroe Marshes on Lake Erie, the latter point being one of the most famous shooting grounds for Redheads and Canvasbacks in the entire west. The birds are now shot mainly from blinds and over decoys, less often from boats which float or sneak among the flocks.

The Redhead is a deep water species, rarely found along the margins of ponds or streams, but usually gathering in large flocks or "rafts" on the open lakes at a distance from shore, where it is constantly diving for vegetable food on which it subsists almost entirely. It travels in v-shaped flocks like geese, and flies with great rapidity, but the common statement that its speed reaches 100 miles per hour is certainly a gross exaggeration. It is safe to say that no species of duck when migrating flies more than

50 or 60 miles per hour—most species hardly more than 40 miles. Its flesh is held in high esteem, and after feeding for a time on "wild celery" the bird is considered almost equal to the Canvasback under similar circumstances. When in poor condition neither species is as good as the Mallard.

This species is an early migrant ins pring, arriving in southern counties from March 15 to 25 and lingering through April. Most of the birds have gone north from the region of Detroit by the first of May, and they do not come south in any numbers until late October; the best shooting occurring during November and December. Probably a few spend the winter about the mouth of the Detroit River, or more rarely on Lake St. Clair, but formerly the Redhead nested occasionally within our limits. In 1879 or 1880 the late W. H. Collins found two nests at St. Clair Flats, one containing seven and the other eight eggs (Bull. Nuttall Club, V. 61, 62). J. H. Langille also reported the Redhead as nesting commonly at St. Clair Flats at about the same time, and described the young as "olive green with the cheeks and under parts bright yellow (Bull. Buffalo Soc. Nat. Hist. V, 1879, 34, 35). It seems probable that an occasional pair even nowadays nests in the same region, as Mr. Swales in a recent letter states that he is "assured that a pair nested in the Dickinson Marshes (St. Clair Flats) in the summer of 1901." In Wisconsin, according to Kumlien and Hollister, "even at present a few pairs are said to nest annually in the large marshes about Lake Koshkonong (Birds of Wisconsin, p. 21).

In North Dakota where the species breeds abundantly, Mr. A. C. Bent states that the nest is well made of flags and reeds and lined with white down. It is usually surrounded by water and is placed among growing flags, its rim being seldom as much as a foot above the water. Fresh eggs were found abundantly between the first and middle of June and the sets varied from 6 to 22, the latter being an extraordinary number, but believed to be the product of a single bird. The next highest number was sixteen and the average number between ten and fourteen. Mr. Bent states that the Redhead seems to be particularly careless about laying its eggs in other ducks' nests. He found one of its eggs in a Ruddy Duck's nest, and in three cases found from three to four of its eggs in nests of a Canvasback, but never found the eggs of any other species in the Redhead's nests (Auk, XIX, 8-9).

The eggs are olive buff or greenish buff, with a very smooth and extremely hard shell, and average 2.42 by 1.73 inches.

TECHNICAL DESCRIPTION.

Adult male: Head and neck all round bright reddish-brown, often glossed with purple; lower neck, upper back and upper breast velvet black; rest of back, scapulars, sides and flanks wavy cross-lined with black and white (canvas-pattern), the lines being of about equal width. Most of breast and belly white, the latter grayer posteriorly; rump and upper and under tail-coverts deep black; speculum gray or bluish gray, some of the inner secondaries tipped with white.

Adult female: Without any red on head or neck, or any wavy pencilling anywhere. Mainly grayish brown, darker above, lighter below, the chin and throat alone white. Wing nearly the same as in male.

Length (sexes nearly alike), 17 to 21 inches; wing 8.50 to 9.25; culmen 2.05 to 2.25.

44. Canvasback. Marila valisneria (*Wilson*). (147)

Synonyms: White-back.—Anas valisineria, Wils., 1814.—Fuligula vallisneria, Steph., 1824.—Aythya vallisneria, Boie, 1826, and many others.—Aethyia vallisneria, Ridgw., 1881.

The adult male can be confused only with the male Redhead, but is always blackish about the face, chin and crown. In common with the Redhead and Ringneck the adults of both sexes have the pale bluish-gray speculum. For other distinctions see remarks under Redhead.

Distribution.—Nearly all of North America, breeding from the northwestern states northward to Alaska.

This duck is seen almost invariably in flocks, these gathering often into large companies of many hundred individuals. Like the Redhead this species in Michigan is more common along the Great Lakes than on the ponds and streams of the interior, yet it occurs sparingly in the latter situations. It is one of the earliest ducks to arrive in the spring, appearing usually as soon as the ice goes out, commonly early in March, sometimes even in the last week of February. In the fall it reappears in October and in places where food conditions are favorable may remain until late December. Its favorite food, the "eel-grass" or so-called wild celery (Vallisneria spiralis) has been planted in several places during recent years and attracts many kinds of ducks. It gives a peculiarly rich flavor to the flesh, and "celeryfed Canvasbacks" are the best of fine eating. As a matter of fact, other ducks which feed on the same plant are nearly or quite as good and it is doubtful if even the expert can discriminate between Canvasback and Redhead, or even Bluebill, if he had no other guide than his palate. Formerly the birds were slaughtered by all sorts of abominable devices, including night floating, punt guns, sail-boats and steam launches, as well as by the more legitimate methods of decoys. At present they are sometimes obtained by "sneaking" or drifting down upon flocks in the open water in a boat more or less concealed by rushes, bushes, and similar disguises, but the greater number are shot from blinds or hiding places over painted wooden decoys.

Possibly this species once nested in small numbers at St. Clair Flats (Langille, 1879) but we can find no proof that it did so, and certainly at the present time it is altogether unlikely that it nests anywhere within our limits. Its proper breeding grounds are far north, in Manitoba, the Saskatchewan Valley, and Great Slave Lake. Probably the most southern nesting locality is in the northern part of North Dakota, where (in Steele county) Mr. A. C. Bent found a few nests in 1901. These were placed in tall grass, entirely surrounded by water, and were made of grass, dead flags and reeds, and sparingly lined with gray down. Three nests, found June 7 or 8, contained eight, eleven, and eight eggs respectively, one of them containing also four eggs of the Redhead, one three of the Redhead, and the other one of the Ruddy Duck. The Canvasback's eggs are readily distinguished from those of any other species, being a rich grayish olive or greenish drab, of a darker shade than any of the others (Auk, XIX, 11, 12). The eggs measure 2.48 by 1.76 inches.

TECHNICAL DESCRIPTION.

Adult male: Chin, face, and top of head black or blackish shading gradually into rich reddish brown of the rest of the head and neck; chest, upper back and upper breast deep black; back, scapulars, sides and flanks beautifully cross-lined or "vermiculated" with black and white, the white lines being about twice as wide as the black ones, the result being a very light canvas pattern (whence the name "White-back"); rump and upper and under tail-coverts black; lower breast and belly white, the latter grayish posteriorly. Speculum bluish gray, some of the secondaries white-tipped, two or three of the inner ones black-edged. Adult female: Head, neck and upper breast cinnamon or umber brown, the throat and face lighter and more rusty; back, sides and flanks grayish brown, usually more or less cross-lined with white; rest of under parts white or grayish white. Length 20 to 23.50 inches; wing 8.75 to 9.25; culmen 2.10 to 2.50.

45. Greater Bluebill. Marila marila (*Linn.*). (148)

Synonyms: Big Bluebill, Blackhead, Broadbill, Greater Scaup, Raft Duck, Flocking-fowl, Shuffler.—Anas marila, Linn., 1761.—Fuligula marila, Steph., 1824.—Fulix marila, Bd., 1858, B. B. & R., 1884.

The adult male is known by its size, dull blue bill, uniform greenish-black head and neck, with black nape, and pure white speculum tipped with black. The female is similar, but browner, and has a conspicuous white face or "mask."

Distribution.—North America, breeding far north. South in winter to Guatemala.

This bird is usually confounded with the Lesser Bluebill from which it can be discriminated only with difficulty. It is probable that nine-tenths of the records for Bluebills relate to the Lesser Bluebill and not to the present species, which is much less common, more northern in its distribution, and probably the species which most often remains in the open waters about the state during the winter. In most respects it is impossible to discriminate between the two species and I know of nothing peculiar in the habits of the Greater Bluebill which requires mention. The only record of its nesting in Michigan is by the late W. H. Collins, who found one nest containing three eggs in the summer of 1879. "The nest was built in a tuft of flags, and composed of rushes and wild rice lined with some down and feathers. It was resting in the water and held in place by the tuft of flags in which it was built. I killed the female." (Bull. Nutt. Orn. Club, V. 62). Mr. A. C. Bent states that "The American (Greater) Scaup Duck probably breeds sparingly in North Dakota, but I have no evidence to prove it, and I am inclined to think that if it occurs there at all it is extremely rare." (Auk, XIX, 1902, 165). The eggs are pale buffy olive gray, and average 2.54 by 1.71 inches.

TECHNICAL DESCRIPTION.

So similar to the following species, the Lesser Bluebill, that except in two or three particulars the same description would answer for both. The most important difference is in the size, the present species being decidedly larger, and this is particularly noticeable in the width of the bill which ranges from .85 to 1.05 inch, the average being .97, while in the Lesser Bluebill the greatest width ranges from .80 to .95 inch, the average being .89. In the male of the Greater Bluebill the black of the head and neck always (?) shows a greenish gloss, and the flanks are pure white without any cross-lines or spots, while the Lesser Bluebill has a purplish gloss on head and neck and the flanks distinctly cross-lined with dusky. The females of the two species probably are separable only by the measurements. Length 18 to 20 inches; wing 8.25 to 9; culmen 1.85 to 2.20.

46. Lesser Blue-bill. Marila affinis (*Eyt.*). (149)

Synonyms: Little Scaup Duck, Little Blackhead, Raft Duck, Flocking Fowl, Shuffler. —Fuligula affinis, Eyt., 1838.—Fulix affinis, Baird, 1858, B. B. & R., 1884.

Plate III.

Not distinguishable from the preceding at gunshot range, nor with the bird in hand except after careful examination. The principal difference lies in the measurements.

Distribution.—North America in general, breeding chiefly north of the United States, migrating south to Guatemala and the West Indies.

The Lesser Bluebill is mainly migratory in Michigan, and probably one of the most abundant migratory ducks of the state, occurring in suitable places everywhere, inland as well as on the Great Lakes. It is always found in large flocks, which gather in great companies in open water and on its feeding grounds, whence it gets the name of "Raft Duck and Flocking Fowl." It gets most of its living by diving and is fond of the same food as the Redhead and Canvasback with which it associates more or less. It is much less suspicious than either of these birds, comes readily to the decoys, and is therefore one of the good table ducks most often bagged by the gunner. It appears in spring as soon as the melting of the ice permits, indeed in some years numbers undoubtedly remain in favorable localities throughout the winter. The great majority pass north as soon as navigation opens and nest far north of our boundaries. Nevertheless a few undoubtedly nest each year within our limits. Mr. Newell A. Eddy of Bay City states that he is satisfied that it breeds in the marshes at the mouth of the Saginaw River; the late W. H. Collins found many of these birds, with the Greater Bluebill, at St. Clair Flats in the summer of 1879, but did not find any nests, believing that he was too early for them, although one nest of the Greater Bluebill was found (Bull. Nutt. Orn. Club, V, 62). Mr. Swales (letter, October, 1904) says "I have seen this species several times at the Flats in June, July and August. The past summer a flock of some 15 to 18 birds remained all of June and July near Bryant's on the Snibora. This flock consisted of both males and females and they were wary and apparently in excellent condition. I have no doubt that they bred on the Dickinson Island marshes, protected. A number of the residents tell me that a few pairs still breed in the isolated parts and in the marsh near the mouth of the Clinton River, Lake St. Clair."

In North Dakota Mr. Bent found the nest to be "A hollow scooped in the ground profusely lined with dark, almost black down mingled with a little dry grass and occasionally a white feather. They are late breeders, a majority of the eggs laid during the second week in June or later." He found as many as fifteen eggs in one nest, but the average was from ten to twelve. He states that the eggs are "rich olive buff, and the lightest types approach somewhat the darkest types of the Mallard's eggs, and the darkest types are rich dark buff or deep coffee-colored. The nests were all on dry ground, but never more than fifty yards from water." (Auk, XIX, 265-66).

As with many other species the male Bluebills flock by themselves after the females begin to sit. The eggs average 2.25 by 1.58 inches.

TECHNICAL DESCRIPTION.

Adult male: Bill light grayish blue, with a black nail; head, neck, chest and upper back black, the head generally with a purplish gloss; most of breast, belly, and sides pure

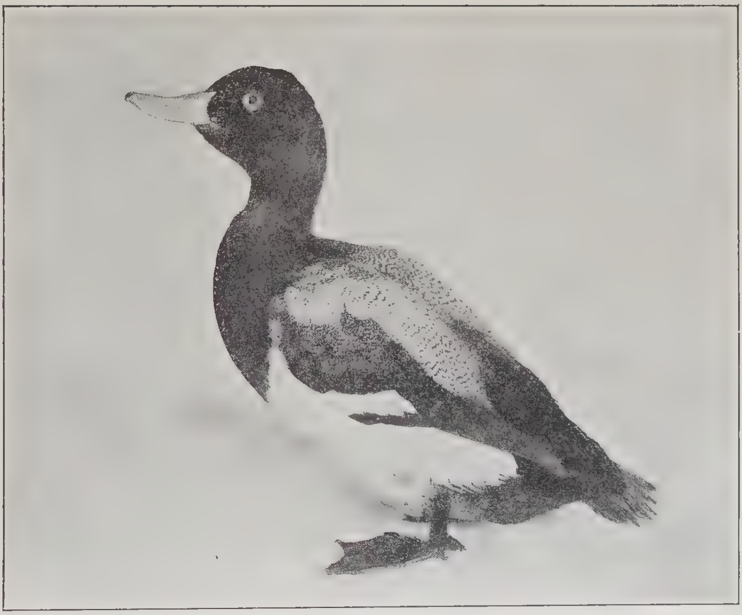

Plate III. Lesser Bluebill.
From photograph of mounted specimen. (Original.)

white, the belly grayish posteriorily and the sides and flanks distinctly waved with dusky; back and scapulars with numerous zig-zig cross lines of black and white; wings black, the speculum pure white tipped with black; rump and upper and under tail-coverts black. Adult female: Wings and speculum much as in male, but wings browner; head, neck and upper back brown; a conspicuous area of white feathers about the base of the upper mandible (but not on the chin); breast grayish or grayish-brown, whiter on the belly, browner on the sides; back and scapulars brownish; rump and upper tail-coverts brownish-black, under tail-coverts grayish-brown.

Length 15 to 16.50 inches; wing 7.50 to 8.25; culmen 1.58 to 1.90; greatest width of bill .80 to .95.

47. Ring-necked Duck. Marila collaris (*Donov.*). (150)

Synonyms: Ring-necked Scaup. Ring-neck, Ring-bill, Ring-billed Blackhead, Marsh Blue-bill (?).—Anas collaris, Donovan, 1809.—Fuligula collaris, Bonap., 1842.—Fuligula rufitorques, Nutt., 1834, Aud., 1835.—Fulix collaris, Baird, 1858, B. B. & R., 1884.

Figure 22.

Most resembles the Lesser Bluebill, from which it may be known by the dark bill with light cross-bar beyond the middle, the white chin marking, and the speculum, which is bluish-gray, never white. The adult male always shows the chestnut collar, but females and immature males lack this.

Distribution.—North America, breeding far north and migrating south to Guatemala and the West Indies.

In many ways this bird resembles the Bluebill and Redhead to which it is closely related, but in habits it differs in at least two respects: It is usually found singly or in pairs, rarely if ever in large compact flocks; also, it seems to prefer inland waters, ponds, and marshy streams rather than the larger open waters so much frequented by its relatives. Naturally it may be supposed that its food is decidedly different, but I am not aware that this has been proved. It dives easily and stays under water a long time, and there is no reason why it should not feed precisely as does the Bluebill.

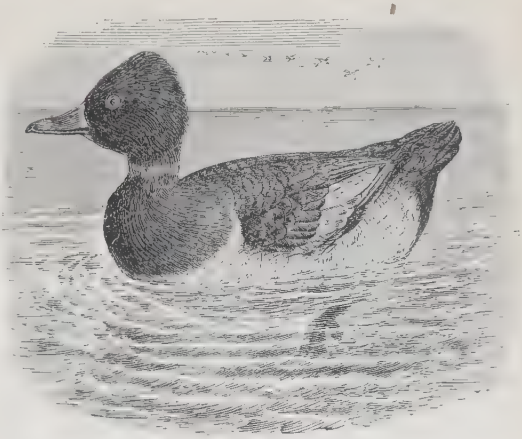

Fig. 22. Ring-necked Duck.
From Baird, Brewer & Ridgway's Water Birds of North America. (Little, Brown & Co.)

It arrives from the south somewhat later than the Bluebill, probably most often between March 20 and April 10, in the southern counties. In the fall it goes south in September and October.

It is not known to nest within our limits, but is one of the commonest nesting ducks throughout northern Minnesota, and is not uncommon in North Dakota. Mr. Job found a nest June 14, 1898, in the Turtle Mountains, with twelve buffy eggs nearly fresh (Auk, XIX, 166). The eggs in color are like those of the Bluebill, and average 2.23 by 1.57 inches.

This species seems to be much less common in Michigan than any other member of the genus. Mr. Swales states (Birds of S. E. Mich., 1904) "I know little of this bird and have not met with it personally at the Flats or on Detroit River, or seen it in any of the ducker's cabins. Purdy says 'taken at Plymouth as a migrant.'" According to Chas. L. Cass this species remained at Hillsdale, Michigan, until November 26, 1894. Mr. L. Whitney Watkins has a specimen taken in Jackson county, April 18, 1894, and there are two specimens, male and female, in the Agricultural College collection taken at Greenville, Montcalm county.

According to the late Percy Selous "in June, 1896, a pair of Ring-necked Ducks spent weeks on Baldwin Lake (near Greenville), and probably were nesting." Most of the public and private collections in the state have specimens of this duck, but it is certainly never common.

TECHNICAL DESCRIPTION.

Adult male: Head, neck, chest and back black, the chin with a snow-white triangular patch, and the lower neck encircled by a chestnut ring; the head and neck glossed with purplish, and the feathers of the occiput usually elongated, forming a dense, bushy, more or less erect crest. Lower breast and belly white; flanks finely cross-lined with white and dusky; rump and upper and under tail-coverts black. Speculum blue-gray, sometimes very narrowly white-tipped. The black scapulars are sometimes minutely sprinkled with white. Bill black, bordered by white at the base, and crossed near the tip by a bluish-white band. Adult female: Similar only as to the speculum and wings. Head, neck, breast and back grayish-brown, deepest on the crown and neck, whitening to gray or soiled white about the base of the bill and on chin and throat; rump brownish-black; lower breast and belly soiled whitish; hinder part of belly grayish-brown like breast; under tail-coverts gray.

Length 15.50 to 18 inches; wing 7 to 8 culmen 1.75 to 2.

48. Whistler. Clangula clangula americana *Bonap.* (151)

Synonyms: Golden-eye, American Golden-eye, Whistle-wing, Spirit Duck, Garrot.—Clangula americana, Bonap., 1838.—Anas clangula, Linn., 1766, part.—Glaucion clangula, Kaup.—Clangula glaucion, Bonap.—Bucephala clangula, Coues, 1872.

Figure 23.

A large, handsome, black and white duck with a green-black head and a rounded spot of pure white on each side between eye and bill. The female has brown instead of black head, and other dark parts slaty gray instead of black; no white cheek spot.

Distribution.—North America, breeding from Maine and the British Provinces northward; in winter south to Cuba and Mexico.

The Whistler or Golden-eye is one of the best known ducks in the state, yet apparently is nowhere very abundant. It does not spend the summer within our limits, and is late in arriving from the north, few coming before the first of November. Unless driven south by heavy ice some of them stay all winter. Even at Sault Ste. Marie, where the river remains open on account of the swift current, Mr. W. P. Melville says that they are found all winter. Butler states that on southern Lake Michigan this is the common winter duck,

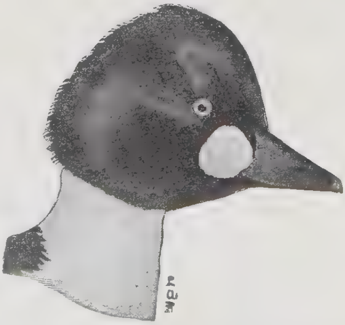

Fig. 23. Whistler. From Bailey's Handbook of Birds of the Western United States. (Houghton, Mifflin & Co.)

staying all winter (Birds of Indiana, 1897, p. 621). Swales (Birds of S. E. Michigan, 1904), says "A common migrant and winter resident, late October and late April. It is the common winter duck in Detroit waters, frequenting the open channels cut by the ferry and car boats. Becomes more abundant in spring."

It seldom occurs in large flocks, the maximum being a dozen or fifteen individuals. Oftener it is seen singly or in little squads of two to five. It is a shy bird, usually being the first species to take alarm in a mixed flock. The whistling noise made by the wings is characteristic, and of course has given it its name. It dives most expertly and often avoids the shot by diving at the flash of the gun, whence the name Spirit Duck.

Our only nesting record for the state appears to be Major Boies' statement that it breeds about Neebish Island in the St. Mary's River (Bull. Mich. Orn. Club I, 1897, 18). At Umbagog, Me., Mr. William Brewster found it breeding, and gives a full account in the Auk, Vol. XVII, 1900, 207. The bird nests always in a hollow tree, often entering through a hole from 10 to 30 or 40 feet above the nest. "This is lined with down and the eggs vary from 5 to 15, oftenest 8 or 10. Two females often lay in the same nest, and often several eggs of the Hooded Merganser are laid with them." The eggs average 2.38 by 1.71 inches.

It feeds freely on shell-fish, and along the sea coast is considered hardly fit for food, but in the Great Lake region its flesh is commonly well flavored and it doubtless feeds much on vegetable matter.

TECHNICAL DESCRIPTION.

Adult male: Bill black, iris golden yellow; head and upper neck glossy black with greenish reflections and a large, rounded, snow-white spot between the base of bill and eye (Fig. 23); lower neck, breast, belly and sides pure white; hinder part of flanks and sides of tail brownish-black; back, rump and upper tail-coverts black; scapulars black with broad white stripes; wing mainly black with a large white patch on secondaries and coverts. Adult female without any trace of the white cheek spot, the head and neck brown instead of black; the chest gray, separated from the brown neck by a whitish ring; the rest of the bird much like male, but with less white on wings and none at all on scapulars, and the back slaty instead of clear black.

Length of male 18.50 to 23 inches; wing 9 to 9.30; culmen about 1.65. Female about 16.50; wing 7.90 to 8.30; culmen about 1.30.

49. Barrow's Golden-eye. Clangula islandica (*Gmelin*). (152)

Synonyms: Rocky Mountain Golden-eye.—Anas islandica, Gmelin, 1789.—Clangula Barrovii, Sw. & Rich., 1831.—Fuligula Barrovii, Nutt., 1834.—Bucephala islandica, Baird, 1858.—Clangula islandica, Bonap., 1842.

Figure 24.

Extremely like the common Golden-eye, the males practically alike except in the shape of the white cheek spot; the females almost identical.

Distribution.—Northern North America, south in winter to New York, Illinois and Utah; breeding from the Gulf of St. Lawrence northward, and south in the Rocky Mountains to Colorado; Greenland and Iceland. Accidental in Europe.

The evidence for this species as a Michigan bird is not voluminous. A careful search of the museums and private collections of the state failed for a long time to reveal a single specimen of undoubted Michigan origin. Finally Mr. E. R. Kalmbach, of Grand Rapids, sent us the skin of a female taken March 22, 1907, by Mr. Bernard DeBries, on Black Lake, Ottawa county. To remove all possible doubt this specimen was referred to the U. S. National Museum, at Washington, D. C., and the identification confirmed by Dr. C. W. Richmond. So far as we know this is still the only unquestionable Michigan specimen on record. Specimens have been taken in Wisconsin, Ontario, Illinois, Indiana, and Ohio, and there can be no doubt that the bird occurs once in a while in Michigan waters in winter. Nelson states (Bull. Nutt. Orn. Club, I, 41) that it occurs on Lake Michigan in winter. Stockwell (F. & S. VIII, 380) says "Common on St. Clair Flats and Sarnia Bay, Michigan, in winter." This certainly is not true now whatever may have been the case twenty years ago.

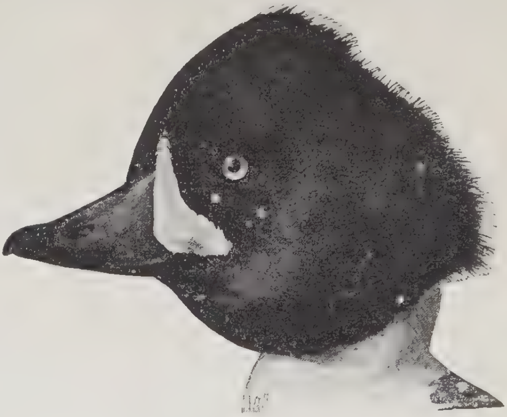

Fig. 24. Barrow's Goldeneye.
From Coues' Key to North American Birds, 5th ed.
(Dana Estes & Co.)

In a letter dated December 15, 1906, Mr. B. H. Swales of Detroit states that he has good reason to believe that a bird of this species was taken on the Detroit River about April 1, 1905, and mounted by Mr. Campion of that city. The latter described the bird accurately and sketched the crescentic white spot on the side of the head which is so different from the circular or oval spot of the common Whistler.

The statement in Cook's Birds of Michigan (1893, 2nd edition, p. 43) as to the capture of a specimen at Hillsdale in 1892, proves to be an error. Prof. Frank Smith, now of Illinois University, who mounted the specimen, states that it was a female of the common Golden-eye. The statement on the same page attributed to N. A. Eddy of Bay City is also incorrect, Mr. Eddy himself having informed me that he has never taken this species in Michigan waters. There is an adult female of Barrow's Golden-eye in the Kent Scientific Museum at Grand Rapids, but its origin is entirely unknown. Kumlien & Hollister (Birds of Wisconsin, p. 24) say "Large numbers of Golden-eyes remain on Lake Michigan during winter, and no doubt this species [Barrow's] is of regular occurrence with them. It was reported from Racine in 1860 by Dr. Hoy; one specimen was sent to Thure Kumlien from Edgerton in 1877, and one was shot by L. Kumlien November 14, 1896, on Lake Koshkonong."

Its nesting habits are similar to those of the Whistler, but it does not nest within our limits. The eggs are dull pea-green, or pale grayish pea-green, and average 2.47 by 1.77 inches.

TECHNICAL DESCRIPTION.

Adult male: Bill black, feet orange yellow. Similar in general to the male Whistler, but the white spot on the side of the head larger, somewhat crescent-shaped, and rounded triangular in outline, the broad base near the corner of the mouth and the apex well above the eye. The conspicuous white wing patch is crossed by a broad black bar, which is not found in the common Whistler. The female is described by Ridgway as having the "brown of head (usually a deep sepia or purplish snuff-brown) descending to the middle of neck all round; gray of chest broader and usually deeper, and white collar narrower than in the same sex of *clangula*."

Length of male 21 to 23 inches; wing 9 to 9.40; bill from tip to frontal angle 1.65 to 1.80; depth at base .95 to 1.10.

Female: Wing 8.25 to 8.75; bill from tip to frontal angle 1.40 to 1.70; depth at base .80 to .95.

50. Bufflehead. Charitonetta albeola (*Linn.*). (153)

Synonyms: Butter-ball, Butter Duck, Spirit Duck, Dipper.—Anas albeola, Linn., 1758.—Fuligula albeola, Bp., 1828, Nutt., 1834, Aud., 1838.—Clangula albeola, Steph., 1824, and authors generally.—Bucephala albeola, Baird, 1858, and some others.

Figure 25.

The small size, general black and white plumage, puffed head of velvet black with purple and green reflections, and pure white cheeks and occiput make the male unmistakable; the female is smaller and browner, lacking entirely the clear or metallic black and snowy white of the male, except that there is a broad white wing-bar.

Distribution.—North America; south in winter to Cuba and Mexico. Breeds from Maine and Montana northward through the Fur Countries and Alaska.

This well known and beautiful little duck is an abundant migrant throughout the state, some often remain all winter in favorable places, and it is possible that a few nest within our limits. In 1893 Dr. R. H. Wolcott wrote "Common every winter on the rapids at Grand Rapids, fished for by factory hands along the banks with hook and line." Swales (Birds of S. E. Mich., 1904) says "In fall I have seen it as early as September 6, but it is October before the main body arrives. It remains until early December if not later. Generally reappears in the latter part of of March, remaining until late April; occasional birds remain well into May." Purdy, at Plymouth, says "One of the most common ducks during migration, arriving from April 1 to 15, depending on weather." Saunders mentions that a few pairs breed at St. Clair Flats (McIlwraith's Birds of Ontario, 1894, p. 84).

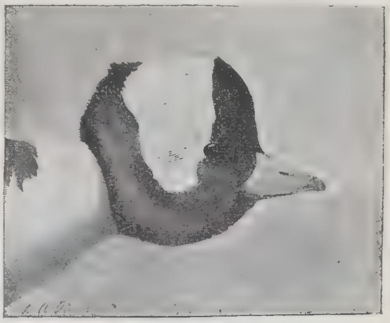

Fig. 25. Bufflehead—Male.
From Bailey's Handbook of Birds of the Western United States. (Houghton, Mifflin & Co.)

The species is similar in its habits to the Whistler, being restless, inquisitive but shy, but so abundant that it is killed in large numbers. In fall and winter it is usually extremely fat, and probably it is this fact which has given it the names Butter-ball and Butter Duck.

It is never seen in large flocks, and does not fly in the "wedge formation" used by so many ducks; as Lynds Jones remarks it "flies in bunches, not flocks." Like the Whistler it nests in hollow trees and its eggs are dull light buff, averaging 1.98 by 1.46 inches.

TECHNICAL DESCRIPTION.

Adult male: Head and neck changeable metallic blue-green-purple except for a large wedge-shaped patch of pure white on each side of the head which has its apex below the eye and spreads backward covering the whole hinder half of the head; feathers of hind head and neck thick, bushy and elongated, whence the name Bufflehead. Back, wings, and tail mostly black or slaty black, the wing with a large white patch formed by the wing-coverts, secondaries and outer scapulars. Entire under parts from neck to tail, pure white, sometimes washed with grayish on the hinder belly and under tail-coverts and a few of the posterior flank feathers sharply edged with jet black. Bill black, feet and legs yellow. Adult female: Upper parts brownish black, deepest on head and rump; under parts white, washed with gray on chest, sides and flanks; speculum and part of the greater coverts white, as also a patch on the side of head below and behind the eye. Bill and feet black.

Length of male 14.25 to 15.25 inches; wing 6.75 to 6.90; culmen 1.10 to 1.15. Length of female 12.25 to 13.50; wing 5.90 to 6; culmen .95 to 1.

51. Old-squaw. Harelda hyemalis (*Linn.*). (154)

Synonyms: Old-wife, Long-tailed Duck, Sou'-southerly, Coween, or Cowheen, Cockawee, Squealing Duck, Winter Duck.—Anas hyemalis, Linn., 1758.—Anas glacialis, Wils., 1814.—Harelda glacialis, Steph., 1824, and many authors.—Fuligula glacialis, Aud.

Figure 26.

The male is known from any other duck by its striking black and white plumage, comparatively short neck, and very long middle tail-feathers.

Distribution.—Northern Hemisphere; in North America south to the Potomac and the Ohio (more rarely to Florida and Texas), and California; breeds far northward.

This duck is by no means uncommon during cold weather on the Great Lakes and is found with more or less regularity on many of the smaller inland lakes and streams. The fact that it winters regularly wherever open water can be found has given it the name of Winter Duck, a name more generally applied to this than to any other one of the several species which stay with us through the winter. It is most often found in fair sized flocks and these frequently unite into bands of several hundred in favorable localities. It is extremely noisy and the constant gabbling undoubtedly has earned it the names of Old-squaw and Old-wife.

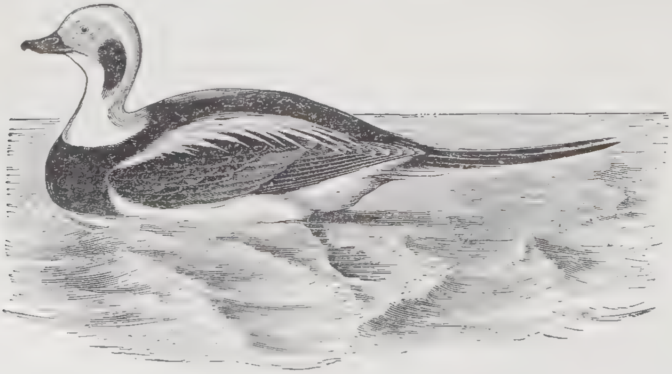

Fig. 26. Old Squaw.
From Baird, Brewer & Ridgway's Water Birds of North America. (Little, Brown & Co.)

Like its relatives it feeds largely on fish and dives to considerable depths in order to secure them. The late Dr. J. W. Velie told me that this was the regular winter duck on Lake Michigan off shore from St. Joseph, being fairly abundant some years while only a few were seen during other winters. Several observers mention the fact that it is often caught in the gill nets set in deep water for lake trout and whitefish. One fisherman at St. Joseph told me most positively that he had seen it caught repeatedly in nets set at a depth of 30 fathoms (180 feet). Butler (Birds of Indiana, 1897, p. 625) says "The depth to which they dive may be known by the fact that they are often caught in that vicinity (off Michigan City) in abundance in gill nets in 20 or 30 fathoms of water.

They usually pass north in February or early March, and the latest record I have is one given by Mr. Stewart E. White, Grand Rapids, Michigan, where he observed three April 3, 1891. They are taken occasionally on the Grand River near Lansing, as well as on the smaller lakes in that vicinity. We also have records from Greenville (Jan. 31, 1899), Grand Rapids, Kalamazoo and several other inland points; and it is reported from nearly every point along the shores of the Great Lakes. It is late in coming from the north, although it often appears toward the end of October. W. P. Melville states that in the winter of 1897-98 large numbers starved to death at Sault Ste. Marie, owing to the fact that the open water was frozen by the intense cold. Ordinarily the species spends the winter in the rapids of the St. Mary's River at that place. This is one of the species recorded as killed on Spectacle Reef Lighthouse in Lake Huron, February 25, 1885.

It nests in the Arctic regions, abundantly on the shores and islands of Greenland, Iceland, Alaska, and even as far south as Labrador. The nests are of grass and weeds, and lined with down, and the eggs vary from dull pea-green to light olive-buff, and average 2.05 by 1.49 inches.

Although a handsome species the Old-squaw is not a favorite with gunners, mainly because its flesh is tough and usually ill-flavored, but also because it is a difficult bird to hit while flying (on account of its great speed) and even more difficult to shoot while swimming, since it dives at the flash of the gun and swims long distances under water.

TECHNICAL DESCRIPTION.

Adult male in winter: Entire top of head and back of neck, chin, throat, upper chest and back all round, pure white; sides of head smoky-gray, sides of neck black above brown below; lower chest and upper breast clear black; lower breast, belly, under tail-coverts and outer tail feathers pure white; sides and flanks pearl-gray; back, rump, upper tail-coverts and four middle tail feathers black or brownish-black; scapulars bluish-white; wing mainly black, part of the secondaries brown. Bill black, crossed by an orange band; legs and feet black, iris yellow.

Adult female in winter: Similar, but head, neck and entire under parts mainly white, the chest only grayish, and top of head dusky; upper parts dark brown, the scapulars bordered with lighter and gray-tipped.

Length of male 20.75 to 23 inches; wing 8.50 to 9; middle tail-feathers 8 to 8.50; culmen 1.10. Length of female 15 to 16 inches, the middle tail-feathers not lengthened.

52. Eider Duck. Somateria dresseri *Sharpe.* (160)

Synonyms: American Eider, Common Eider, Big Sea Duck, Shoal Duck.—Anas mollissima, Wils.—Fuligula mollissima, Nutt., Aud.—Somateria mollissima, Bonap., Baird, Coues.

Separable from everything except the King Eider by its large size and the peculiarities of the bill and head.

Distribution.—Atlantic coast of North America, from Maine to Labrador; south in winter to Delaware and west to the Great Lakes.

This bird must be considered an extremely rare winter visitor to the Great Lakes. Dr. Gibbs says that W. H. Collins of Detroit wrote him in 1883 that he had one specimen in his collection (a young male showing white traces), taken on the Detroit River in December, 1882. Kumlien and Hollister (Birds of Wisconsin, p. 25) say "Lake Michigan in winter, rare. Recorded at Racine in winter of 1875 by Hoy. Two specimens were also taken at Milwaukee, and were preserved in the Public Museum. A female was shot on Lake Koshkonong (Wisconsin) in November, 1891." E. W. Nelson states (Bull. Nutt. Orn. Club, I, 41) that an immature specimen was shot near Chicago in December, 1874, and was in his collection. Dr. H. B. Bannister of Evanston, told him that he had seen other specimens taken near that place. McIlwraith records two specimens from Ontario, one taken near Hamilton and the other near Toronto (Birds of Ontario, 1874, p. 89).

This is a true salt water species, and its occurrence in the Great Lake region must be considered as rather unusual. It is abundant along the New England coast during winter and gathers in great flocks on the shoals about the Island of Nantucket, Mass. It formerly nested on the coast of New Brunswick and the neighboring islands on the coast of Maine, laying five to ten (?) eggs in a large grassy nest on the ground. The nest is heavily lined with down from the breast of the bird, and this is the eider-down of commerce. The eggs vary from grayish pea-green to olive-buff and average 2.97 by 2.01 inches. When the first egg is laid there is but little down in the nest, but more is added every day, so that long before the eggs hatch they are deeply embedded in the down, often entirely covered by it.

In arctic and sub-arctic regions where the various species of eider nest in great colonies, the eider-down is systematically gathered, each nest being robbed at least twice and sometimes a third time, although care is used commonly not to persecute the birds so far as to compel abandonment of the nesting grounds. All the eiders dive with great ease and are able to remain below the surface for a long time. They feed mainly, if not entirely, on aquatic animals, such as crabs, barnacles, clams, mussels, snails and fish, and as a natural consequence their flesh has an unpleasant, fishy flavor which does not commend it to the average palate.

Eiders are heavy, robust, hardy birds, delighting in icy waters and not infrequently found riding the waves of the open sea far out of sight of land. Many of them linger in the far north through the entire winter, frequenting the open seas about southern Greenland and in Hudson Bay. In flying they keep near the surface of the water; travelling in long lines, single file, and alternately flapping their wings and sailing.

TECHNICAL DESCRIPTION.

Adult male: Entire top of head, from forehead to nape, clear bluish black, extending below the eyes, divided on the occiput and nape by a narrow stripe of cream color, and bordered on the sides and nape by rich pea-green which covers the sides and back of neck like a hood. Remainder of head and neck all round, together with back, scapulars, tertiaries, wing-coverts and sides of rump, pure white; lower throat, chest and upper breast pale buff or rich cream color, sharply bounded below by the deep velvety black of the entire lower parts; flight feathers (primaries), rump, upper tail-coverts and tail also clear black. Bill pale yellow; legs and feet light green; iris brown. Adult female: Without any white or green; above brownish-black; barred with yellowish-brown or rusty; breast and sides similar, the belly being mostly without bars; head and neck light brown or buff streaked with brownish-black. Length 20 to 26 inches; wing 11 to 12; culmen about 2.25. In both male and female the feathering of the sides of the head (lores) extends forward as far as (but below) the hinder end of the nostril.

53. King Eider. Somateria spectabilis (*Linn.*). (162)

Synonyms: Anas spectabilis, Linn., 1758.—Fuligula spectabilis, Bp., Nutt., Aud.—Somateria spectabilis of authors generally.

The large v-shaped black mark on the throat usually separates the adult male of this species from the Common Eider; females and young can be separated by careful comparison with named specimens, or with good descriptions, the outline of the feathering at the base of the upper mandible being distinctive.

Distribution.—Northern parts of Northern Hemisphere, breeding in the Arctic regions; in North America south casually in winter to Georgia and the Great Lakes.

Like the preceding species this is a rare winter visitor to the waters of the Great Lakes bordering Michigan. The actual records are few. There are two specimens, male and female, in the Kent Scientific Museum (Cat. Nos. 20342, 20343), labeled as collected at Grand Rapids by Thomas Harmer, but without other data. Dr. Gibbs quotes from a letter from W. H. Collins of Detroit: "Several specimens taken in young and female plumage. One specimen in Smithsonian Institution identified by Professor Baird, and one specimen in my own collection taken at St. Clair Flats, 1874." Kumlien & Hollister (Birds of Wisconsin, p. 26) say "Although this species occurs only as a rare winter resident on Lake Michigan, there are more authentic records than of the Common Eider. Has been taken at Racine, and there is now a specimen in the Milwaukee Public Museum, taken at Milwaukee many years ago." Mr. E. W. Nelson (Bull. Nutt. Orn. Club, I, 41) says: "An adult female taken at Chillicothe on the Illinois River, in the winter of 1874, has been sent to the National Museum by W. H. Collins of Detroit, Mich." It seems likely that the last named specimen is the same as one of those noted above by Dr. Gibbs. McIlwraith states that specimens have been seen occasionally in winter near Hamilton and Toronto, usually in immature dress, so that they could be identified only by capture. He adds, however, that "On the 25th of November, 1889, Mr. Cross reports having obtained a fine male in summer plumage, which was shot on Toronto Bay." (Birds of Ontario, 1894, p. 90.)

Like the preceding this species occurs in small flocks during the coldest weather and its habits are very much like those of the Common Eider. It also has the same breeding range, and its nest and eggs are similar. As a rule the eiders lay only five or six eggs in a set, and when more are found it doubtless is due to the use of the same nest by more than one female.

The hardy nature of these birds and their ability to dive to great depths for their food, enables them to winter with comfort in the open sea or lake wherever the water is not too deep for them to feed. It seems possible that both species of eider may occur with some frequency in winter on the Upper Lakes, but that their presence is seldom detected because navigation of these waters is so generally suspended at this season.

TECHNICAL DESCRIPTION.

Adult male: Similar in color pattern to the preceding species (S. dresseri), but with the head bluish-gray; with less green on the side, the base of the much expanded upper mandible narrowly bordered by black feathers. There is a v-shaped black mark on the upper throat, and the scapulars and tertiaries are entirely black. The bill is largely orange, as also the legs and feet; iris bright yellow. The female and young closely resemble those of the Common Eider, but the feathering of the side of head (lores) extends but slightly forward toward the nostril, while in the Common Eider the feathering extends forward below the hinder end of the nostril. Slightly smaller than the Common Eider, the wing measuring 10.50 to 11.25 inches.

54. Black Scoter. Oidemia americana *Sw.* (163)

Synonyms: American Scoter, Black Coot, Black Sea-coot.—Anas nigra, Wils.—Fuligula americana, Nutt., Aud.—Ædemia americana, Coues, 1872, Ridgw., 1881.

Known by the swollen bill, uniform dark color, and absence of white spots on head or wings at any age.

Distribution.—Coasts and large inland waters of northern North America, breeds in Labrador and the northern interior; south in winter to New Jersey, the Great Lakes, Colorado and California.

This bird undoubtedly occurs more frequently on the Great Lakes than most people suppose, but as a rule gunners do not discriminate between the females and young of the three species of scoter, hence many of the records are indefinite. Probably, however, this is the least common of the three. Mr. Newell A. Eddy of Bay City obtained a specimen in the market at Bay City, October 26, 1883. Butler in his birds of Indiana does not mention the species, which is odd, since the bird is known to occur regularly on Lake Michigan. Kumlien & Hollister say "Rather common winter resident on Lake Michigan. Less common in the interior, occurring principally as a migrant in late fall" (Birds of Wisconsin, p. 26).

It should be looked for in Michigan waters from late October until the following May, but it is most likely to occur in November and April. It feeds largely on shellfish of various kinds, and its flesh is coarse and fishy. It breeds far north, laying white or buffy eggs in a down-lined nest on the ground. The eggs average 2.55 by 1.80 inches.

TECHNICAL DESCRIPTION.

Feathering of the forehead extending forward on the bill about as far as that of the sides of the head (lores), and not much beyond the corner of the mouth. Adult male with basal half of bill orange or yellow, the base much swollen, the terminal half black. Entire plumage, including lining of wing, black, without any white patches on head or wings; legs and feet black. Adult female: Grayish brown all over, darker above, lighter below; the bill without the swollen knob at base; the legs, feet and bill plain blackish.

Length 17 to 21.50 inches; wing 8.75 to 9.50; culmen 1.65 to 1.80.

55. White-winged Scoter. Oidemia deglandi *Bonap.* (165)

Synonyms: White-winged Coot, White-winged Sea Coot, Velvet Duck, Velvet Scoter, Lake Huron Scoter.—Anas fusca, Wils., 1814.—Fuligula fusca, Bonap., Nutt., Aud.—Oidemia bimaculata, Baird, 1858.—Melanetta velvetina, Baird, Ridgw. and others.

Figure 27.

Known in any plumage by the swollen bill, uniform black or dusky color and white speculum. Adults show a distinct white spot on the side of the head, below the eye in the male, behind the eye in the female.

Distribution.—Northern North America, breeding in Labrador and the Fur Countries; south in winter to Chesapeake Bay, southern Illinois, and San Quentin Bay, Lower California.

Undoubtedly this is the commonest scoter of the Great Lake region, occurring regularly on Lakes Huron and Michigan in winter, although

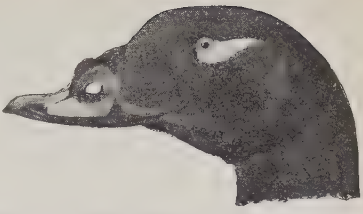

Fig. 27. White-winged Scoter.—Male.—From Bailey's Hand book of Birds of the Western United States. (Houghton, Mifflin & Co.)

the larger number probably winter farther south. The bird is not confined to the Great Lakes, but visits the smaller inland waters, and has been taken at various interior points throughout the state. Our record of specimens includes the following localities: St. Clair Flats, St. Clair Co., Sault Ste. Marie, and Neebish Island, Chippewa Co., Pine Lake, Ingham Co., Heisterman's Island and Bay City, Bay Co., and Point Mouille Marsh, Monroe Co., (November 11, 1904). It is found usually in flocks of varying size and according to Kumlien & Hollister it is "At times exceedingly abundant on Lake Michigan, vast flocks being met with at long distances from land. It is often taken in fishermen's nets in deep water far from shore" (Birds of Wisconsin, p. 26).

Like the preceding, this species nests in the far north, but is not quite so boreal. We have no record of its nesting within our limits, yet it is not impossible that it may do so. It breeds abundantly in Labrador, Alaska, and much of the intervening territory. Mr. A. C. Bent gives the following facts in regard to its nesting in North Dakota (the Devils Lake region): "The nests were on islands among rosebushes, well hidden, being hollows scooped in the ground, the eggs always thickly covered with rubbish when left. New nests have no down, but it is added when the set is complete. In North Dakota it was the latest of our ducks to breed, few eggs were laid before the last week in June. June 27, 1898, Mr. Job found eight nests containing eggs varying in number from 1 to 14, and all fresh. The eggs are pale salmon buff or flesh-color. They average 2.68 by 1.83 inches" (Auk, XIX, 170-171).

TECHNICAL DESCRIPTION.

Feathering of sides of head (lores) extending forward on the bill much farther than the corner of the mouth. Wing always with a white speculum. Adult male: Sides and tip of bill orange-yellow in life, the middle line white, the rest black. Legs and feet red; iris white. Entire plumage deep black except for a conspicuous white speculum and a small curved white spot below and behind the eye. Adult female: Similar, but brownish or grayish-black, grayest below; the speculum white as in the male, but the white on side of head never a single, sharply defined, curved spot, but usually appearing as two rather diffuse white patches, one between eye and bill, the other some distance behind the eye. Bill blackish; feet and legs dark flesh-color to brownish black; iris dark brown.

Length 19.75 to 23 inches; wing 10.65 to 11.40; culmen 1.40 to 1.70.

56. Surf Scoter. Oidemia perspicillata (*Linn.*). (166)

Synonyms: Surf Duck, Surf Coot, Skunk-head Coot, Skunk-top.—Anas perspicillata, Linn., 1758.—Fuligula perspicillata, Aud.—Pelionetta perspicillata, Reich., Baird, Ridgw.

Figure 28.

The male is known at once by its swollen bill, and uniform black plumage except for a large white spot on the top of the head and another on the nape, whence the name "Skunkhead"; the female is similar, but with no white on the top or nape, but a "thumb-mark" of white at base of bill on each side. No white on wings at any age.

Distribution.—Coasts and larger inland waters of northern North America; in winter south to Florida, the Ohio River, and San Quentin Bay, Lower California. Accidental in Europe.

This duck is probably not as common in our waters as the preceding, but owing to its conspicuous markings it is more generally recognized and hence more often recorded. Like the others it is a bird of late fall, winter and early spring, but not so likely to remain through the winter as the White-winged Scoter. Mr. N. A. Eddy calls it less common in fall migration on Saginaw Bay. Major Boies secured one which was killed on the St. Mary's River near Neebish Island about the middle of October; one was killed at St. Clair Flats October 13, 1904, by W. H. Marquette, and mounted in Detroit (Swales); J. Claire Wood reports a female from Detroit River November 10, 1903; E. W. Nelson says it is common on Lake Michigan and adjacent waters (Bull. Nutt. Orn. Club, I, 41). Kumlien & Hollister say "Not rare on Lake Michigan in winter, and usually found on all the larger inland lakes in late fall. Seldom taken in the spring, most of the specimens being young or immature birds" (Birds of Wisconsin, p. 26).

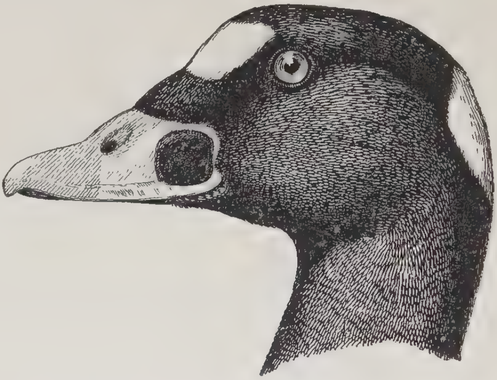
Fig. 28. Surf Scoter—Male.
From Hoffman's Guide to the Birds of New England and Eastern New York. (Houghton, Mifflin & Co.)

Like the other scoters this species feeds mainly on shellfish and spends much of its time in diving for this food. Its flesh is rank and fishy in consequence. It nests well to the northward, and we have no reason to suppose that it ever breeds within our limits. The nest and eggs are similar to those of the other scoters, and the eggs, which are pale buff or pale creamy buff, average 2.47, by 1.70 inches.

TECHNICAL DESCRIPTION.

Feathers of the head extending much farther forward than those of the lores; sides of the upper mandible swollen at the base and naked. Adult male entirely black except for a squarish white patch on the crown between the eyes and a much larger triangular white patch on the nape; wings without any white; bill in life conspicuously colored with black, red, and white; iris white. Adult female mainly dusky gray or grayish-brown, somewhat paler on the belly, and usually with an indistinct whitish patch near the corner of the mouth; the bill not much swollen at the base and uniformly dark colored. Young in first winter similar to adult female, but the sides of the head with two indistinct white patches, one near the base of the bill, the other below and behind the eye.

Length of male 20 to 22 inches; wing 9.25 to 9.75; culmen 1.30 to 1.60. Length of female 18 to 19 inches.

57. Ruddy Duck. Erismatura jamaicensis (*Gmel.*). (167)

Synonyms: Spine-tail Duck, Fool Duck, Deaf Duck, Shot-pouch, Bull-neck, Rook, Roody, Dipper, etc. Anas jamaicensis, Gm., 1789.—Anas rubida, Wils.—Fuligula rubida, Sw. & Rich., 1831, Aud., 1838.—Erismatura rubida, Bp., 1838, and most later authors.

Figure 29.

The small size, short, thick neck and extremely short upper tail-coverts, leaving the tail-feathers exposed almost to their roots, are points which serve to identify this species in any plumage. When swimming its habit of carrying the tail erect, almost like a hen, often aids in its recognition.

Distribution.—North America in general, south to the West Indies and through Central America to Columbia; breeds throughout much of its North American range and south to Guatemala.

The Ruddy Duck is one of the best known of the smaller ducks, its familiarity, its numbers, and the manner in which it avoids the sportsman by diving, having made it familiar even to the youngest Nimrod, and it has received more or less appropriate and distinctive names in all parts of the country. Trumbull in his "Names and Portraits of Birds" lists sixty-seven common synonyms for it, and doubtless there are others in common use which that writer did not happen upon.

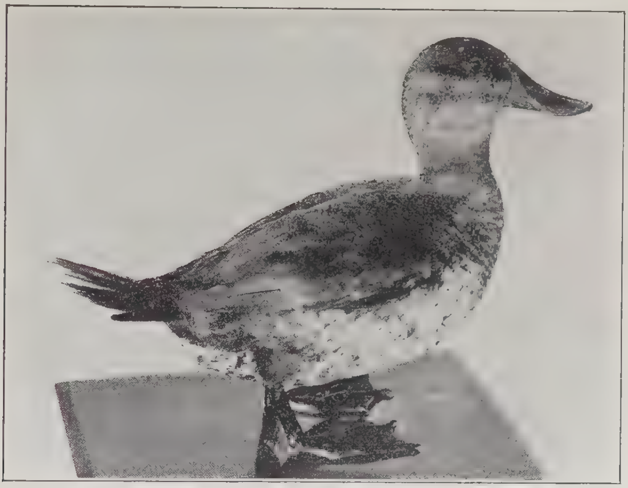

Fig. 29. Ruddy Duck.
From photograph of mounted specimen. (Original.)

This little duck comes to us in large numbers from the north in October, passes southward before the lakes freeze over, and returns to us again in April. While here it frequents ponds, streams and large and small lakes wherever suitable food is to be found. It is largely vegetarian in its diet and secures most of its food by diving. It is one of the species most often seen on protected ponds, particularly in parks and on reservoirs, where it doubtless does a large amount of good by eating the seeds and bulbs of water plants which might otherwise decay and pollute the water. I once took from the crop and stomach of a single Ruddy Duck at Middletown, Connecticut, 22,000 seeds of a species of pondweed (*Naias*) which at that time was growing in great abundance in the city reservoir, where the bird was shot.

Much difference of opinion exists as to the table quality of this duck, many writers averring that its flesh is coarse, tough and fishy. My own experience is just the reverse of this, and I have found the bird in autumn uniformly tender and well flavored. The birds scatter somewhat in feeding, and, as they are commonly found in flocks of considerable size, some are always on the surface serving as sentinels while the others are feeding below. In flight they keep well together in compact bunches and fly with great rapidity. Having once found a good feeding ground they are loath to leave it and will return day after day in spite of continued persecution. They are not easy birds to kill and the name "Shot-pouch" in common use in some parts of the country probably suggests the large number of shot which they can carry away.

The only description of the nesting of this species in Michigan waters which we have been able to find is that given by Langille in his account of the bird life of St. Clair Flats. It must be borne in mind that these Flats lie partly in Michigan territory and partly in Ontario, and we have no means of knowing the exact region in which the observations were made. Conditions, however, are nearly identical on the two sides, so that it makes little difference. His account is as follows:

"Not infrequent in this locality is the nest of the Ruddy Duck, the birds being quite common about the channels. The nests are generally very slight, often scarcely more than a matting together of the tops of the marsh grass over the water with a few additional grasses woven in; sometimes, however, the nest is well made of fine grasses, especially if incubation be advanced; sometimes it is but a slight placing of debris in a decayed cavity of a floating log the arrangement being so imperfect that the eggs may roll out. These eggs are peculiar enough for a duck. Larger than those of the larger ducks, nearly white and somewhat granulated, they might easily pass for the eggs of some of the smaller wild geese; especially as the duck can scarcely ever be caught on the nest, but stealthily dives from it like a grebe, before the hunter can detect it. These eggs may be found as late as July" (Rev. J. H. Langille, Bull. Buffalo Soc. Nat. Sci., Vol. 5, 1877, p. 36).

In Michigan the Ruddy Duck is almost universally distributed during migration, but probably does not often nest within our limits. The late W. H. Collins reported taking its eggs, presumably at St. Clair Flats, and McIlwraith says that he has seen it there in summer and has been told that a few pairs breed there every season (Birds of Ontario, 1894, p. 94.). E. W. Nelson found it breeding in Illinois (Birds of N. E. Illinois, p. 143). In North Dakota, according to A. C. Bent, it nests in "deep water sloughs," always in reeds, over water and surrounded by water, much like the Redhead and Canvas-back. He found the female the shyest of all the ducks, never flushed from the nest or seen near it, and showing no anxiety for its welfare.

It is a late breeder, all the nests found during the second week in June being incomplete or with fresh eggs. The eggs, six to ten in number, are extremely large for the bird, rounded, pure dull white, with a finely granulated or roughened shell. They average 2.42 by 1.80 inches.

TECHNICAL DESCRIPTION.

Adult male in full plumage: Entire upper parts of head and nape black; cheeks, chin and under tail-coverts pure white; front and sides of neck, back, rump, upper tail-coverts, scapulars, chest, sides and flanks, bright chestnut; remainder of under parts silver-white to silver-gray; tail black; wings brownish gray without white bars or colored speculum; bill in life light blue, feet and legs blackish; iris brown. Adult female without any chestnut; the black of the male replaced by brown, and the pure white of the cheeks and chin by grayish white or grayish-brown; the under tail-coverts pure white; tail brownish-black; most of upper parts brownish-gray, the under parts grayish or brownish white, often strongly tinged with rusty. Young of the year are similar to the adult female, but often show various mixtures, and young males frequently have chestnut feathers on head, neck and back.

Length about 13.50 to 16 inches; wing 5.75 to 6; culmen about 1.50 to 1.60.

GEESE.

KEY TO SPECIES.

- A. Head and part of neck pure white. B, BB.
  - B. Wing-tips (primaries) black, rest of plumage pure white. Snow Goose (adult). No. 58.
  - BB. Wing-tips not black, most of plumage grayish brown, wing-coverts bluish-gray. Blue-winged Goose (adult). No. 59.
- AA. Head and neck mainly black. C, CC.
  - C. A white "cravat" extending across upper throat from cheek to cheek. Canada Goose and Hutchins' Goose. Nos. 61, 62.
  - CC. No white cravat, but sides of neck spotted with white. Brant. No. 63.
- AAA. Head and neck mainly brownish or grayish. D, DD.
  - D. Face (i. e. forehead and feathers about base of bill) white; breast or belly usually with black patches. White-fronted Goose (adult). No. 60.
  - DD. Head without white. E, EE, EEE.
    - E. Rump white (general plumage grayish). Snow Goose (immature). No. 58.
    - EE. Rump slaty brown. White-fronted Goose (immature). No. 60.
    - EEE. Rump grayish. Blue-winged Goose (immature). No. 59.

58. Lesser Snow Goose. Chen hyperboreus hyperboreus (*Pall.*). **(169)**

Synonyms: Snow Goose, Common Snow Goose, White Brant, Wavey, Common Wavey. —Anser hyperboreus, Pallas, 1769, Nutt., Aud., Baird and others.—Anas hyperboreus, Gm., Wils.—Chen albatus, Elliot, 1869.—Chen hyperboreus, Boie, 1822, Ridgw., 1881, Coues, 1882.—Chen hyperboreus albatus, Ridgw., 1880.

Plate IV.

The adult at a little distance appears to be snow-white all over; in reality it is so except for the outer wing feathers (primaries), which are black, and the bill and feet, which are dull red. The young are grayish all over, more or less striped with dusky above.

Distribution.—Pacific coast to the Mississippi Valley, breeding in Alaska, and probably the entire Hudson Bay region; south in winter to southern Illinois and southern California; casually to New England.

The Lesser Snow Goose is with difficulty separable from its sub-species the Greater Snow Goose (*nivalis*), both of which have been reported from Michigan and other parts of the Great Lake region repeatedly. The adults of both are almost precisely alike in everything except size. The present species, the Lesser Snow Goose, averages decidedly smaller than the sub-species *nivalis*, and in addition the bill in the latter bird is said to be "constantly longer and relatively more slender than that of the western bird, *hyperboreus*" (Bishop). The geographical range of the two species is widely different, for, according to Dr. L. B. Bishop, the Greater Snow Goose breeds only in Eastern Greenland and is confined chiefly in winter to the coast of North Carolina, while the Lesser Snow Goose breeds from the Hudson Bay region westward and in winter is found mainly if not entirely in the interior.

We have numerous records of Snow Geese in Michigan, sometimes under the name of *hyperboreus*, sometimes *nivalis*, and occasionally with no indication as to the species or subspecies. It seems likely that without exception all these records refer to the Lesser Snow Goose, *Chen hyperboreus*, unless possibly specimens of the totally different Blue-winged Goose have sometimes been mistaken for young Snow Geese. The older records of Snow Geese from the state certainly are not reliable in so far as this question is concerned. The only satisfactory evidence at our disposition consists of the few specimens still accessible known to have been taken within our limits or very near them. Of these there seem to be in all less than a dozen, but without exception these prove to be Lesser Snow Geese. These, so far as I am able to record them, are as follows: One taken at St. Clair Flats November 5, 1905 by a local sportsman and recorded by Swales and Taverner as the Lesser Snow Goose, after careful measurement and examination of a sketch of the bird by J. H. Fleming and Dr. Louis B. Bishop; one specimen, an immature female in dusky plumage, taken October 27, 1905 on Point Pelee near Leamington, Ontario; an immature specimen in the Barron collection at Niles, identified by the writer, and probably taken in the vicinity of Niles, although without data (Possibly this is one of the two specimens recorded by D. D. Hughes as shot from a flock of five in Calhoun county November 4, 1867; he states that both of these were mounted for his collection); an adult specimen in full plumage received from A. H. Boies of Hudson, who states that it was killed in Hillsdale county, November 28, 1890.

In addition to these positive records there are numerous records of the occurrence of Snow Geese in various parts of the state. Dr. Gibbs states "I have shot Snow Geese in Kalamazoo county, but am not able now to say which species, and the specimens are not available." O. B. Warren says "Occasionally seen in Marquette county during the fall migrations, one was taken in 1895." Mr. L. Whitney Watkins states that a flock of one hundred and fifty was seen at Manchester, near the boundary between Washtenaw and Jackson counties, April 2, 1894. Major Boies states that Snow Geese are "said on good authority to frequent the waters of Hay Lake and Monosco Bay, St. Mary's River." Snow Geese are also reported as not uncommon in Wisconsin, Illinois, Indiana, Ohio and Ontario, but in most cases the records seem to be no more satisfactory as regards the subspecies than those of our own state. Mr. P. A. Taverner quotes Mr. J. H. Fleming of Toronto as saying that he has found only specimens of the Lesser Snow Goose in the collections which he has examined in Ontario. On the other hand W. W. Cooke states that both forms of the Snow Goose occur during the winter season in the lower Mississippi Valley. "It seems probable that in this district the Mississippi River is the approximate dividing line between the two forms, to the westward *C. hyperborea* being the more common, and to the eastward *C. nivalis*. Both forms winter as far north as southern Illinois, and the Lesser Snow Goose is abundant in winter in Louisiana and Texas. * * * It winters sparingly in southern Colorado, more commonly in Utah, abundantly in Nevada, and along the Pacific coast." (U. S. Dep't of Agriculture, Biological Survey, Bull. No. 26, 1906, p. 66).

Under the head of the Greater Snow Goose Mr. Cooke states "There is

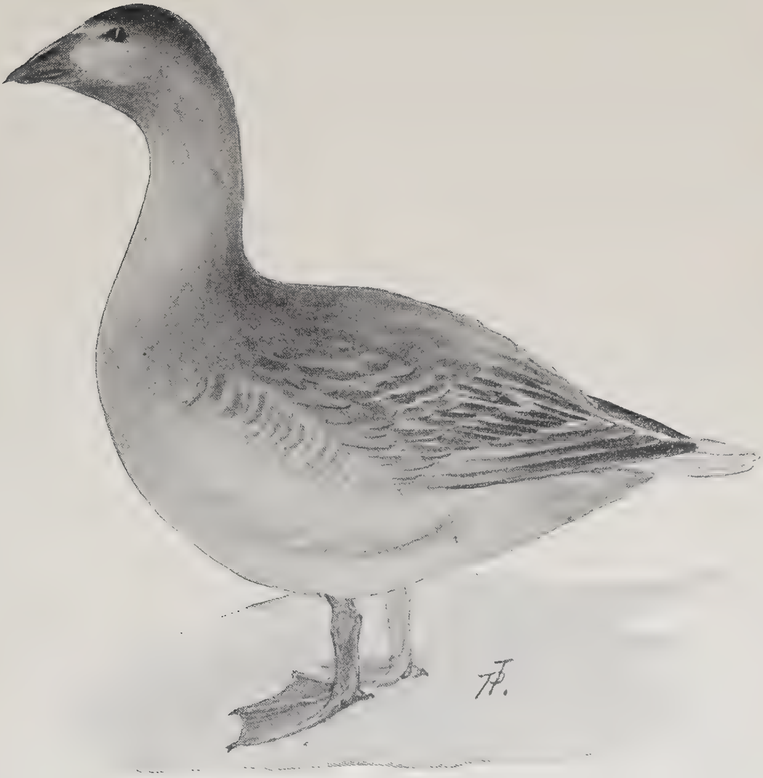

Plate IV. Lesser Snow Goose. Immature.
From drawing by P. A. Taverner. (Original.)

no sharply defined line in the Mississippi Valley between the winter ranges of the Greater and Lesser forms. In general the Greater Snow Goose is the more common east of the Mississippi River and winters from southern Illinois to the Gulf" (Ibid, p. 68).

As seen in Michigan Snow Geese usually occur in small flocks of ten to forty individuals, flying at a considerable height and usually in an irregular flock, seldom in a straight line or the v-shaped flock so characteristic of the Canada Goose. When they alight to rest they sometimes select open water in some of the inland lakes or the larger rivers, but they also frequently alight in open fields, when, however, it is difficult to approach them and hence specimens are seldom obtained.

Like all geese they get a large part of their food from the dry land, eating grass and other herbage freely in the manner of the domestic geese. Undoubtedly Snow Geese are far less common at present than a few decades ago, and from present indications the last of them will be seen within a very few years.

The Lesser Snow Goose is known to nest in Alaska and its eggs are described as two to six in number, dirty white, and measuring 3.13 by 2.12 inches.

TECHNICAL DESCRIPTION.

Adult: Primaries and primary coverts black or brownish-black; rest of the plumage pure white except that the feathers of head and neck (and occasionally the breast also) are often stained rusty red at their tips by contact with iron-bearing waters or mud. Bill in life light purplish and with a whitish tip or "nail," the deep gaping space along its sides black. Legs and feet usually purplish red. Sexes alike. Immature birds are mainly gray, paler and less marked below, darker and distinctly streaked above, particularly on the scapulars and tertiaries, the feathers of most of the upper parts with whitish edges, and the rump, upper tail-coverts and tail commonly pure white; under parts grayish or soiled white, becoming clear white on the belly and under tail-coverts.

Length 23 to 28 inches; wing 14.50 to 17; culmen 1.95 to 2.30; tarsus 2.80 to 3.25.

59. Blue-winged Goose. Chen coerulescens (*Linn.*). (169.1)

Synonyms: Blue Goose, Blue Snow Goose, Blue Wavey, White-headed Goose, Bald-headed Brant, Brant.—Anas caerulescens, Linn., 1758.—Anser coerulescens, Vieill., 1823.—Chen coerulescens, Ridgw., 1880.

The adult is known at once by its white head and neck in strong contrast with the gray-brown body. The young of the year can be separated from young Snow Geese only by careful comparison with descriptions, although the wings resemble those of the adult and the white chin appears to be distinctive.

Distribution.—Interior of North America, breeding on eastern shores of Hudson Bay and migrating south, in winter, through Mississippi Valley to Gulf Coast; occasional on Atlantic Coast.

While this bird is far from common in Michigan it appears to be more often seen and taken than any other member of the genus. It occurs only during migration, or possibly in winter, and of course does not nest anywhere within our limits. The following are our records: The late W. H. Collins states that two specimens were taken at St. Clair Flats (Gibbs Manuscript). Mr. N. A. Eddy of Bay City, has a fine male in his collection, taken October 30, 1885, one of a dozen or more which he found in the Bay City markets, said to have been killed on a lake on the Mackinac Division of the Michigan Central, a little north of Bay City, where a large flock was surrounded at night and killed by sticks! There is a fine, full plumaged adult in the collection of the Marsh Club at Monroe, Michigan, killed there. Mr. B. H. Swales says that one was shot by Mr. A. Ralph, November 16, 1888 on Lake St. Clair, near the mouth of the Thames, and is preserved in London, Ontario (MS. List, 1904). We have an adult mounted specimen (No. 6560) in the college museum, taken on Loon Lake, Greenville, Michigan, April 30, 1895, and another specimen (No. 3574) immature, which probably is local but unfortunately has no record. There are also two, one adult and one immature, in the Kent Scientific Museum, Grand Rapids, but without data. Taverner records one killed at St. Clair Flats early in April 1909.

These geese are similar in habits in the main to the Canada Goose, but are said to migrate by night, as well as by day, and to fly in less regular flocks, seldom in the characteristic v-shaped flocks so common with that species. The nest and eggs are unknown.

In common with the snow geese they are known to sportsmen and gunners generally under the name of "Brant," the adult of the former being generally called White Brant, while the young of that species and both old and young of the present species are confounded under the common name of Black Brant.

TECHNICAL DESCRIPTION.

Adult: Entire head and neck all round pure white; chest and base of neck brownish black, the feathers edged with ashy; breast, sides, back, scapulars and tertiaries brownish edged with ashy, the inner scapulars and tertiaries edged with white and with somewhat darker shaft stripes; belly and under tail-coverts white; back, rump, and upper tail- coverts bluish gray to nearly white; wings with the primaries slaty blue to black, the secondaries mainly black, the coverts blue gray; tail pale brownish gray, each feather tipped and margined with white. Bill purplish red, the gaping fissure along the sides black; legs and feet purplish red; iris brown. Sexes alike. Immature: Described by Ridgway as "similar to the adult, but head and neck uniform deep grayish brown, only the chin being white." A specimen in our collection (No. 3574), however, has the back, wings and tail almost like those of the adult, but the head, neck and scapulars brownish gray with a bluish cast, darkest on back of the neck; the breast and most of the under parts light slaty blue with a brownish cast; the chin white.

Length 26.50 to 30 inches; wing 15 to 17; culmen 2.10 to 2.30; tarsus 3 to 3.30.

60. White-fronted Goose. Anser albifrons gambeli (*Hartl.*). (171a)

Synonyms: American White-fronted Goose, Prairie Brant, Speckled-belly, Speckled Brant.—Anser gambelli, Hartlaub, 1852.—Anser albifrons, Bonap., 1828, Nutt., Aud. and others.—Anser albifrons var. gambeli, Coues, 1872.

The adult is known at once by its pure white face or "mask" (whence the name "White-fronted") in strong contrast with the dark gray-brown of the rest of the head and neck.

Distribution.—North America (rare on the Atlantic Coast), breeding far northward; in winter south to Cape St. Lucas, Mexico and Cuba.

This is an extremely rare bird in the state and probably can be classed only as a straggler. McIlwraith states that he has a bird in his collection taken at St. Clair Flats (Birds of Ontario, 1894, p. 97), and Mr. J. H. Fleming, of Toronto, Ontario, writes under date of March 8, 1906 "There is in the collection of Toronto University a mounted White-fronted Goose, taken by the late Dr. Garnier of Lucknow, Ont., probably at Mitchell's Bay, Lake St. Clair." In the Barron collection at Niles, Michigan, I found an adult in good plumage, marked "Brant," but without any locality label. In all probability, however, it was local. It occurs in some of the older lists (Kneeland, 1857), and Stockwell states that it is "common in Michigan" (Forest and Stream, VIII, 23, 380). The bird is not now common anywhere in the Great Lake region, in fact in most places it appears to be only accidental. Kumlien & Hollister say "Formerly an exceedingly abundant spring and fall migrant, but of late years not at all plenty. Frequents the large prairie corn-fields" (Birds of Wisconsin, p. 28).

It breeds in the far north, building a nest on the ground, of grass, weeds, etc., lined with down. The eggs are six or seven, greenish-yellow, and average 3.16 by 2.07 inches.

TECHNICAL DESCRIPTION.

"Adult: Fore part of head, all round, to about half way across lores and forehead, white; rest of head grayish brown (darkest next the white) as are also the neck and upper parts, the latter varied by distinct grayish tips to the feathers; lower parts grayish white, blotched or irregularly spotted with black; anal region, crissum and tail-coverts white; greater wing-coverts ash-gray tipped with white; secondaries blackish edged with white; upper and under tail-coverts white; tail dusky, tipped with white; bill light colored (yellowish or orange in life) with white nail; feet light colored (orange or reddish in life). Young: Similar to adult, but fore part of head dusky instead of white, lower parts without black markings, and nail of bill dusky.

Length 27 to 30 inches, wing 14.25 to 17.50; culmen 1.80 to 2.35, depth of upper mandible at base .90 to 1.20, width .85 to 1.05, tarsus 2.60 to 3.20." (Ridgway).

61. Canada Goose. Branta canadensis canadensis (*Linn.*). (172)

Synonyms: Wild Goose, Common Wild Goose, Big Gray Goose, Honker.—Anas canadensis, Linn., 1758.—Anser canadensis, Vieill., Nutt., Aud.—Bernicla canadensis, Boie, Baird, Ridgw., and others.

Figure 30.

Known from any but Hutchins' Goose by its black head and neck and white "cravat," from this form by its greater size, the weight ranging from eight to twelve pounds.

Distribution.—Temperate North America, breeding in the northern United States and British Provinces; south in winter to Mexico.

This is the Common Goose or Wild Goose of the country and is familiar to even the most unobservant from the fact that it passes northward in the spring and southward in the fall in large noisy flocks which fly ordinarily in the shape of a V, the two sides of which are seldom equal. It is usually stated that an old gander always serves as the leader and pilots the flock on their semi-annual pilgrimages. This may be true, but it is certain that different members of the flock act as leaders at different times, and it is not likely that any one individual is invariably responsible for the direction of the flock.

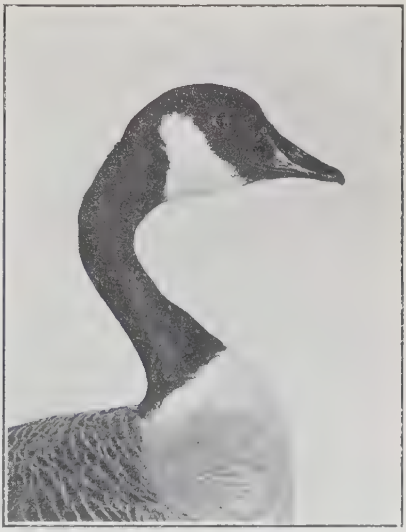

Fig. 30. Canada Goose.
From photograph of mounted specimen.
(Original.)

The knowledge which most people have of this species is limited to these occasional glimpses as the birds pass overhead. Only in favorable localities do they alight, and then their stay is commonly of short duration. During foggy weather or heavy storms they occasionally take refuge in some small pond or river, but ordinarily they alight only on one of the Great Lakes where they are fairly safe from approach. Of course in certain places they stop to feed, frequenting stubble fields or corn fields, but unless the conditions are unusually favorable their visits to these places are made only in the morning or just at evening, and they return to the open water when their hunger is satisfied, or sooner if they are seriously disturbed. Probably a few spend the winter within our limits, since flocks are occasionally seen passing over even in January and February.

Formerly they doubtless nested more or less commonly all over the state, and it is not impossible that single pairs may do so still in favorable places. Dr. Atkins states that in August, 1883, a small flock passed over his house in Locke, Ingham Co., and Major Boies states that he thinks they breed sparingly in the neighborhood of Monosco Bay and Hay Lake, St. Mary's River, and he saw old birds in midsummer on Hay Lake. Kumlien and Hollister state that in Wisconsin "Fifty years ago it was a common breeder in almost any swamp or large marsh, or on the prairie sloughs. At present only scattered pairs nest as far south as the southern third of the state." (Birds of Wisconsin, 1903, p. 28). Butler says "They still breed in some numbers in the Kankakee region and less frequently in other favorable localities. They evidently begin nesting between April 15 and May 1, as nests with the full complement of eggs are usually found from the first to the third week in May" (Birds of Indiana, 1897, p. 637).

The Canada Goose commonly passes through Michigan during March and April and again in October and November, mostly in the latter month. The average date of first arrival for five years was March 5, at Petersburg, Monroe Co., and March 13 at Battle Creek, while the average date for 19 years at various points in southern Michigan was March 14, and the earliest arrival was February 13, 1890, at Petersburg. In the same region the average date of last appearance in autumn is November 7, and the latest date November 25, 1890. Mr. B. H. Swales says "This bird alights on Lake St. Clair in large flocks in April, but is wild and seldom shot. A large flock was seen feeding in a meadow at Lake St. Clair Flats, April 30, 1905—a late record." According to A. C. Bent "In North Dakota, in the Devils Lake region, the Canada Goose nests on islands in the larger lakes and sloughs. It is a very early breeder, the eggs being laid early in May and young generally out by June 1. The nest is a bulky mass of dead flags placed on the ground and very little hollowed" (Auk, XIX, 173-174). The eggs average 3.55 by 2.27 inches; they are white or greenish white, and usually five or six constitute a set.

The young are readily domesticated, but at least for several generations it is necessary to clip their wings spring and fall lest they join some of the flocks of their kindred passing over during migration.

TECHNICAL DESCRIPTION.

Adult: Entire head and neck black except for a white "cravat" formed by two conspicuous cheek patches, which usually unite on the throat; rarely an imperfect white ring about the lower neck; upper parts mainly brown, all the feathers with light grayish tips; rump and part of upper tail coverts clear black, but the shorter coverts pure white, forming a conspicuous cross-bar; under parts light brownish-gray, becoming lighter on the belly and pure white on the under tail-coverts; wings, tail, bill, legs and feet clear black; iris brown. Sexes alike. Young: Very similar to the adults, but the black less pure and the white of cheeks and throat more or less mixed with dark feathers.

Length 35 to 43 inches; wing, 15.60 to 21; culmen 1.55 to 2.70; tarsus 2.45 to 3.70.

62. Hutchins' Goose. Branta canadensis hutchinsii (*Rich.*). (172a)

Synonyms: Goose-brant, Little Canada Goose, Little Wild Goose, Small Gray Goose. —Anser hutchinsii, Rich., 1831.—Bernicla hutchinsi, Woodh., 1853, Baird, 1858.

Precisely like the Canada Goose in everything but size, the present species being from 25 to 34 inches long, the wing 16 inches or less, and the weight often not more than 3 or 4 pounds, and rarely exceeding 6 pounds, while the Canada Goose averages 8 or 9 pounds and often reaches 12 or even more.

Distribution.—North America, breeding in the Arctic regions, and migrating south in winter chiefly through the western United States and the Mississippi Valley; northeastern Asia.

The claim of this bird to a place in the Michigan fauna appears to rest mainly on the statement of the late W. H. Collins, who in a letter to Dr. Gibbs stated that he "had it, taken at St. Clair Flats." It was also reported from Michigan by Stockwell (Forest & Stream, VIII, 23, 380). It is a fair presumption that the species does occur here occasionally, since it has been taken in practically all the surrounding territory. Sportsmen who have the opportunity to examine freshly killed Canada Geese would confer a favor if they would weigh and measure any unusually small specimens and send the notes to us with the address if possible of the owner of the specimens.

The specimen noted by Prof. Cook (Birds of Michigan, 2d ed. 1893, p. 47) as in Moseley's list of Michigan birds in the Kent Scientific Institute at Grand Rapids, proves to have no locality on the label, and may or may not have been taken in the state; it is, however, only a small specimen of *canadensis*, not *hutchinsii*.

Hutchins' Goose nests much farther north than the Canada Goose, along the lower Mackenzie Valley and on the shores and islands of the Arctic Ocean. Its nest resembles that of the Canada Goose, and is usually placed on the ground, although sometimes the old nest of a Fish Hawk, or some other large bird, in a tree, is used. The eggs are commonly four to six, white or buffy white, and average 3.18 by 2.10 inches.

TECHNICAL DESCRIPTION.

In color and proportions of parts precisely like the Canada Goose, but averaging decidedly smaller.

Length 25 to 34 inches; wing 14.75 to 17.75; culmen 1.20 to 1.90; tarsus 2.25 to 3.20.

63. Brant. Branta bernicla glaucogastra *Brehm.* (173a)

Synonyms: Common Brant, Black Brant, Eastern Brant, Brant-goose, White-bellied Brant.—Bernicla glaucogaster Brehm., 1831.—Branta bernicla, Bann., 1870.—Anser bernicla, Nutt., Aud.—Bernicla brenta, Steph., 1824, Bd., Ridgw., Coues.

Distinguished from any other goose by the entirely black head and neck with merely a small patch of white streaks or flecks on each side of the upper neck.

Distribution.—Northern parts of the Northern Hemisphere; in North America chiefly on the Atlantic coast; rare in the interior, or away from salt water.

This bird is properly a bird of the seashore and its occurrence inland is always to be looked upon as accidental. According to some of the early writers "the Brant" was at one time not an uncommon migrant across the western end of Lake Erie and along the Detroit and St. Clair rivers. Major Boies states that formerly it was no uncommon thing to see several flocks of this species passing up the Detroit River in spring, flying at a considerable height and rarely stopping to feed or rest; even during the spring of 1904 he states that he saw one or two flocks. Steere (1880) says it is a transient; Stockwell says "One shot on Sarnia Bay, two on the St. Clair Flats, and two on Torch Lake, all in Michigan" (Forest & Stream, VIII, 380).

We are constrained to believe that all the foregoing notes on "brant" refer to the immature and dark colored Snow Geese and Blue-winged Geese, which are generally known as "Brant" or "Black Brant" among sportsmen throughout Michigan. Mr. O. B. Warren's record of the specimen taken in Calhoun county in 1884 (Cook, Birds of Michigan, 1893, 2d ed. 47), comes in the same category, for the Albion Museum specimen (personally examined by the writer) proves to be an immature Blue-winged Goose. There are, however, two specimens of genuine Brant in the collection of the Monroe Marsh Club, taken many years ago on the Monroe marshes, but the exact date is not known. The taxidermist (Mr. Sauvage) who assures me that he mounted them, says that they were killed between 22 and 25 years ago, that is, between 1877 and 1880. They were examined by the writer in March, 1905, and are typical specimens, one, however, in immature plumage. It is possible, but not probable, that these are the birds recorded by Robt. B. Lawrence (Forest & Stream, Vol. 32, p. 316) as follows: "On November 8, 1888, John Boyse, a local gunner, killed at Monroe, Mich., a pair of Brant which were sent on to New York to be mounted by John Wallace. The said Brant were examined by Mr. George N. Lawrence and pronounced to be the common eastern species, *Branta bernicla.*" It seems likely that this gives us two authentic records for the state, at least eight years apart, each record relating to two specimens, but all four from the same limited region. McIlwraith records the Brant for Ontario somewhat doubtfully, stating that "it seems partial to the seacoast" and "I have only seen it once, flying past out of range" (Birds of Ontario, 1894, p. 101).

This species is similar in many ways to the other members of the genus, and builds a similar nest on the ground, of grass, weedstalks, or moss, lined with down. It breeds only within the Arctic Circle, and the eggs, usually four, are white or buffy white and average 2.92 by 2.02 inches.

TECHNICAL DESCRIPTION.

Adult: Bill, feet, and claws black; iris brown. Head and neck all round, and a little of fore part of body, glossy-black, well defined against color of breast; on each side of neck a small patch of white streaks; frequently also white touches on eyelids and chin. Breast light ashy-gray, beginning abruptly from the black, fading on belly and crissum into white, shaded along sides of body. Upper parts brownish-gray; feathers of dorsal region with paler gray tips; rump darker; upper tail-coverts white. Tail-feathers, wing-feathers, and primary coverts blackish; inner primaries whitish toward base. Young: Similar; general cast of plumage browner, with more pronounced white edging on the wing-coverts, and tips of secondaries quite white; less distinction between colors of breast and belly; back of head and neck rather brownish-dusky, and the patch of white streaks on side of neck light or wanting. Length 24 inches; extent 48; wing 13; tail 4.50; bill 1.33; tarsus 2.25; middle toe and claw about the same.

SWANS.

KEY TO SPECIES.

A. A yellow spot near base of bill, in front of eye; tail-feathers 20. Whistling Swan. No. 64.
AA. No yellow spot on bill; tail-feathers 24. Trumpeter Swan. No. 65.

64. Whistling Swan. Olor columbianus (*Ord*). (180)

Synonyms: Swan, Common Swan, Wild Swan.—Anas columbianus, Ord, 1815.—Cygnus americanus, Sharpl., 1830, Aud., Baird and others.—Olor columbianus, Stejn., 1882.

Recognized on sight from its resemblance to the domesticated swan of our parks and gardens; to be confounded with no other bird except the following species, from which, if adult, it may be known by the yellow spot on each side of the base of the bill; the Trumpeter Swan has entirely black bill and lores.

Distribution.—The whole of North America, breeding far north. Commander Islands, Kamchatka; accidental in Scotland.

This beautiful bird is so conspicuous that it rarely escapes notice when migrating or resting by day. Although it is so wary as to be seldom shot, it is seen frequently during migration, both spring and fall, and is well known to gunners and lake men throughout the state. Single birds or small squads occasionally alight during bad weather in ponds and streams in various parts of the state, but it occurs most regularly on the Great Lakes, particularly on Lake Erie, Lake St. Clair, and the Detroit and St. Clair rivers. From the fact that it is such a difficult bird to shoot most specimens killed are preserved, hence we find specimens in nearly every museum or collection of any size in the state, and doubtless it has been taken in every county. According to Swales (MS. list 1904) "It is a common migrant in southeastern Michigan from March 2 to April 15, and October 26 to November. Large flocks occasionally alight on Lake St. Clair in fall, and commonly do so during the spring. Generally these are wild and wary and keep out in the lake." At Monroe, Michigan, Mr. B. J. Sauvage states that it is seen flying over nearly every spring and sometimes in the fall. At Petersburg, Monroe county, Mr. Trombley records 30 seen flying north April 2, 1894. Major Boies says it is "occasional in the spring and fall at Neebish Island, St. Mary's River." Mr. F. H. Chapin, in a letter dated January 4, 1905, says "A Whistling Swan in my collection weighed 15 pounds when alive. One year ago last November one was shot at Long Lake, Portage township, Kalamazoo county, which weighed 23 pounds. Possibly this was a Trumpeter, but I never saw the bird. Swans are seen on this lake every November but are rarely taken."

Early in March, 1910, large flocks of swans gathered in Lake St. Clair, and on the 12th several were killed by gunners who were ignorant or careless of the law. Four of these swans were subsequently confiscated by the state game warden, Charles S. Pierce, who kindly gave two to the Agricultural College and two to the University of Michigan, and they are now on exhibition in the museums of these institutions.

Kumlien and Hollister say "During late fall, just before the larger lakes freeze over, this species is not at all rare in suitable localities" (Birds of Wisconsin, 1903, p. 31). Butler says "Formerly when these birds were more abundant they migrated in flocks of 20 or 30, and sometimes as many as 50, high in the air, in two converging lines like a flock of Canada Geese. It is said that there is not the noticeable movement of the wings as with geese, yet when traveling at their ordinary gait, with the wind in their favor, it is estimated that they travel at least 100 miles an hour" (Birds of Indiana, 1897, p. 640-641). This estimate of their speed is doubtless much too high, probably 50 miles an hour would be nearer the truth.

It was this species of swan which was killed in large numbers at Niagara Falls about the middle of March, 1908, as noted in the newspapers and described in greater detail in some of the scientific journals. Large flocks alighted in the Niagara River above the falls and on two or three different days numbers were swept over the brink into the seething water and grinding ice below and were either killed outright or were so crippled as to be easily captured by hunters on the watch for them. On March 15 not less than 100 swans were thus killed (Auk, XXV, 1908, 306-309.)

The Whistling Swan breeds in the Arctic or Sub-Arctic regions, the nest being a mere heap of vegetable rubbish on the ground; the eggs, 2 to 5, are white or buffy-white, averaging 4.19 by 2.72 inches.

TECHNICAL DESCRIPTION.

Hinder end of nostril nearer to the tip of the bill than to the corner of the eye, that is, usually nearer to the tip of the bill than the base, tail-feathers 20. Adult: Entire plumage pure white, the bill and feet black, a distinct yellowish spot on or near the base of the upper mandible; iris brown. Young: Ashy or brownish ashy, the bill largely flesh color and the feet grayish or whitish.

Length about 4½ feet; wing 21 to 22 inches; culmen 3.80 to 4.20; tarsus 4 to 4.32.

65. Trumpeter Swan. Olor buccinator (*Rich.*). (181)

Synonyms: Cygnus buccinator, Rich., 1831, Nutt., Aud., and authors generally.

May be separated from the preceding, which it resembles, by three points, viz., much larger size; bill and lores entirely black in adult; nostrils placed midway between tip of bill and eye, or nearer the eye. In the Whistling Swan, according to Ridgway, the nostril is nearer to the tip of the bill than to the eye, and this point holds good at any age after the young are able to fly.

According to Eaton the Whistling Swan is distinguished from the Trumpeter Swan by its smaller size, 20 instead of 24 tail-feathers, yellow or yellowish spot on the side of the bill, and particularly by the different shape and dimensions of the bill (Birds of New York, Vol. 1, 1909, pp. 236-237). The difference in the bills most easily recognized is the fact that in the Trumpeter Swan the sides of the upper mandible are approximately parallel from base almost to tip, while in the Whistling Swan the bill is somewhat spatulate, that is, narrower in the middle than towards the tip. There are also anatomical differences, particularly in the manner in which the windpipe (trachea) is coiled or convoluted in the breast bone or sternum. This point, however, can be determined only by dissection. Eaton claims that the relative position of nostril and eye in the two species is not diagnostic.

Distribution.—Chiefly the interior of North America, from the Gulf coast to the Fur Countries, breeding from Iowa and the Dakotas northward; west to the Pacific coast; rare or casual on the Atlantic.

The Trumpeter Swan is a decidedly rare bird in Michigan; in fact it probably can be regarded only as a straggler. In his manuscript list of the Birds of S. E. Michigan (1904) Mr. B. H. Swales says "I can add no record to that of Dr. Garnier, who shot one at Mitchell's Bay, St. Clair Flats. Mr. Saunders writes me that he has no record of this bird, and has never seen the above specimen." Dr. Gibbs states that W. H. Collins of Detroit wrote him that he "had several specimens, one taken in 1880." I have not been able personally to verify these records, and since the two swans are readily confused they must be accepted with some caution. Major Boies states that it is "More rare than the Whistling Swan, but occasional in spring and fall on St. Mary's river." There is an adult male now in the National Museum at Washington (No. 70317) which was taken at St. Clair Flats, Michigan, November 20, 1875 (Stejneger, Proc. U. S. Nat. Mus. V, 1882, 218). Mr. J. H. Fleming of Toronto, who kindly called my attention to the above record, also states that he has examined a supposed male Trumpeter, taken at Grassy Point, Lake St. Clair, Nov. 30, 1887, and now in a local collection at Toronto, which proves to be a Whistling Swan.

Kumlien and Hollister say "Surely a very rare bird in Wisconsin at the present day, and it is not certain that it could at any time during the past sixty years be called common" (Birds of Wisconsin, p. 31). Mr. Albert Lane, Madison, Minn., says "Not common in Minnesota; seven specimens noted. The heaviest ever examined weighed 16 pounds and was fat; one fine adult male weighed 15 pounds" (Auk, XIII, 78). Mr. Butler tells of one shot at Valparaiso, Indiana, February 22, 1894, which weighed 24½ pounds and measured 50 inches in length and 83 inches between the extended wing tips. He says this specimen is now in the collection of Mr. Ruthven Deane, Chicago. (Birds of Indiana, 1897, p. 642).

In general habits this species does not seem to differ much from the preceding, but it breeds farther south, although apparently some individuals nest as far north as any of the Whistling Swans. The nest and eggs are similar to those of the latter species, but the eggs are larger, averaging 4.46 by 2.92 inches.

TECHNICAL DESCRIPTION.

Hinder end of nostril nearer to the tip of the bill than to the corner of the eye, that is usually nearer the tip than the base of the bill, tail-feathers 24. Adult: Entirely white, as in the preceding species, but the legs, feet and bill entirely black, the latter and the lores without any trace of yellow. Young: Similar to that of the Whistling Swan, but without yellow on bill or lores.

Length 5 to 5½ feet; wing 21 to 27½ inches; culmen 4.30 to 4.70; tarsus 4.54 to 4.94.

Order VII. HERODIONES. Herons, Ibises, Storks.

KEY TO FAMILIES.

A. Bill straight, sharp pointed (Fig. 36). Claw of middle toe pectinate (with a comb on inner edge, Fig. 37b). Family 20, Ardeidæ. Herons, Bitterns, etc. Page 127.

AA. Bill distinctly curved, the tip rather blunt. Claw of middle toe not pectinate. B, BB.

  B. Bill slender, curved throughout, the upper mandible with a distinct groove from nostril nearly to tip. Family 18, Ibididæ. Ibises. Page 124.

  BB. Bill very thick at base, only curved toward the tip. Upper mandible without groove. Family 19, Ciconiidæ. Storks. Only one Michigan species, the Wood Ibis. Page 126.

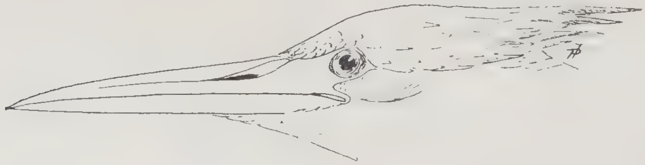

Fig. 36. Head of Green Heron.

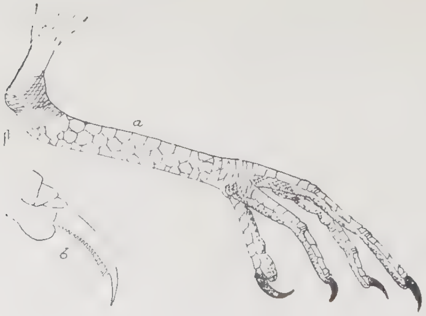

Fig. 37. Foot of Heron. a. Scutellate tarsus. b. Pectinate claw.

Family 18. IBIDIDÆ. Ibises.

(Only one Michigan species, the Glossy Ibis.)

66. Glossy Ibis. Plegadis autumnalis (*Linn.*). (186)

Synonyms: Ibis, Green Ibis, Bay Ibis, Black Curlew.—Tringa autumnalis, Linn.. 1762.—Ibis falcinellus, Vieill., Bonap., Aud., Nutt.—Plegadis falcinellus, Ridgw., 1881,

Figure 31.

Its large size, chestnut and dark iridescent plumage, and decurved bill five inches or more in length, render the species unmistakable. At a little distance the living bird appears to be glossy black.

Distribution.—Warmer parts of Eastern Hemisphere, West Indies, and southern portions of eastern United States, wandering northward to New England and Illinois. In America only locally abundant and of irregular distribution.

In Michigan this species can be considered only as a very rare straggler. One was killed October 6, 1884 on a marsh near the shore of Saginaw Bay, just west of Bay City. Mr. Newell A. Eddy, who got the specimen for his own collection says it is "a young bird, without doubt, of the year, wanting on the head entirely and to a considerable degree on the back the beautiful gloss and purple reflections of the adult bird" (O. & O. X, p. 9). This specimen, according to Moseley, was at one time in the Kent Scientific Institute at Grand Rapids, but I have failed to identify it. In November, 1905, I examined this collection carefully and found two specimens of the Glossy Ibis; one a poorly mounted, immature specimen marked "Grand Rapids," and catalogued as No. 20189, but without other data; the other the skin of a male in full plumage (Catalogue No. 22018) which probably came from the Gunn collection, but was without any data whatever. Possibly the mounted specimen is the one taken near Bay City in 1884; certainly there is no record of an additional capture at or near Grand Rapids. According to Covert (MS. list 1894-95), the late D. D. Hughes recorded another specimen taken at Marshall, Michigan. These cases are the only ones known to me of the occurrence of this species in the state. There are two records for Wisconsin, one for Ohio (Lake county, 1850), and one or more for Illinois, but apparently none for Indiana. At Heron Lake, Minn., it is said to occur singly or in pairs nearly every fall, and at least once has been found nesting (Nidiologist, II, 116). McIlwraith also records the capture of two specimens near Hamilton, Ont., in 1857 (Birds of Ontario, 1894, 105).

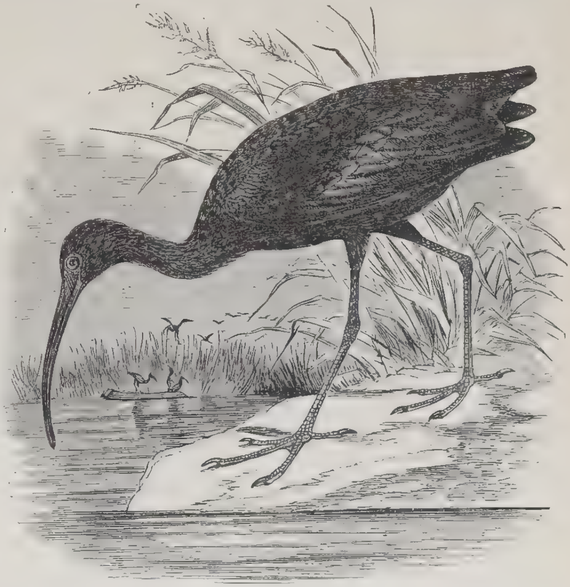

Fig. 31. Glossy Ibis.
From Baird, Brewer and Ridgway's Water Birds of North America. (Little, Brown & Co.)

It is a wanderer from the tropics, where it breeds in swamps, building a nest of the stems of marsh vegetation placed on reeds or low bushes, and laying usually three dark blue unspotted eggs, averaging 2.05 by 1.41 inches.

In regions where it is abundant it is one of the most striking features of bird life. It is found usually in flocks, sometimes of many hundreds, which wade about fearlessly in the shallow water or through the open marshes, their dark metallic plumage glistening in the sunlight, and their quick motions and wheeling flight making a bird picture of unusual beauty.

TECHNICAL DESCRIPTION.

Adult: Feathers about base of bill blackish (lores naked); rest of head and neck, lesser wing-coverts and entire under parts, rich dark chestnut; upper parts, except lesser wing-coverts, dark purplish-green with strong metallic reflections. Bill, feet and legs dark greenish-brown, or black; iris brown. Bare skin between bill and eye dark blue. Sexes alike.

Length 22 to 25 inches; wing 10.20 to 11.85; culmen 4.30 to 5.35; tarsus 2.90 to 4.30.

Family 19. CICONIIDÆ. Storks and Wood Ibises.

67. Wood Ibis. Mycteria americana *Linn.* (188)

Synonyms: Wood Stork, Wood Pelican (Catesby).—Tantalus loculator, Linn., 1758, and authors generally.

Its stork-like appearance, bare head and neck, and strongly contrasted black and white plumage are distinctive.

Distribution.—Southern United States, from the Ohio Valley, Colorado, Utah, southeastern California, etc., south to Argentine Republic; casually northward to Pennsylvania and New York.

This bird must be regarded as a mere straggler to Michigan from the south. Our only positive record is furnished by Mr. P. A. Taverner, of Detroit, who found a freshly mounted specimen in a taxidermist's shop in July, 1910, and on investigation discovered that it was killed at Monroe, Michigan, June 19, 1910. It was an immature bird, and the sex was not determined.

The only other Michigan report comes from Mr. John Hazelwood, of Port Huron, who writes: "I saw and shot at a specimen of the Wood Ibis at this place recently. I have shot this species in Texas and Florida, and a man that has once killed a Wood Ibis could always tell one again, especially if he was within 225 feet from it, which I was when I fired two shots at it. But the bird got away, hit quite hard with No. 1 shot. A large white bird with black wing-tips and black tail, is easy to tell. This bird was following in the flight line of migratory birds, and from this place it flew across the river into Canada, going southeast as far as the eye could see." Mr. Hazelwood does not know the exact date of this occurrence, but it was during the fall migration, probably in August.

The Wood Ibis has been taken several times in Wisconsin, also singly in Pennsylvania, New York and Ohio. According to E. W. Nelson it was "very abundant in the vicinity of Mound City, Ill., on the Ohio River, and at Cape Girardeau on the Mississippi, the last of August, 1875. One was taken near Cleveland, Ohio, in 1879" (Bull. Nutt. Orn. Club, I, 43). Mr. John Hurter states that it was "abundant through August at a small lake in Marion Co., Ill., in 1879, but all disappeared about Sept. 5. Counted fifty at one time" (Ibid., VI, 124).

The Wood Ibis breeds regularly in the Gulf States, and, like some other water birds, wanders north after the breeding season. The nest is of sticks, placed high up in trees, and the eggs are two to three, white and chalky, with pale spots or stains of brownish; they average 2.74 by 1.80 inches.

TECHNICAL DESCRIPTION.

Adult: "Head and neck bare; primaries, secondaries, and tail glossy greenish-black, rest of plumage white. Immature: Head more or less feathered; head and neck grayish-brown, blacker on the nape; rest of plumage as in the adult, but more or less marked with grayish; wings and tail less greenish" (Chapman). Sexes alike.

Length 35 to 45 inches; wing 17.60 to 19.50; culmen 6.10 to 7.30; tarsus 7.00 to 8.50.

Family 20. ARDEIDÆ. Herons, Bitterns, Etc.

KEY TO SPECIES.

A. Large; wing 14 inches or more, culmen over 4 inches. B, BB.
  B. Plumage entirely white. Greater Egret. No. 72.
  BB. Plumage slaty blue or grayish blue above. Great Blue Heron. No. 71.
AA. Medium; wing 6½ to 13 inches, culmen 2 to 3¾ inches. C, CC.
  C. Plumage largely or entirely white. D, DD, DDD.
    D. Entirely white, legs black, feet yellow. Snowy Heron; Lesser Egret. No. 73.
    DD. Mainly white, but primaries tipped with slaty blue, and often scattered patches of slaty blue elsewhere. Little Blue Heron (immature). No. 74.
    DDD. Entire under parts white, crown and back dark green or greenish black. Night Heron (adult). No. 76.
  CC. Plumage with little white—at least on the upper parts. E, EE.
    E. Larger; wing 9 inches or more. F, FF.
      F. Plumage mainly slaty blue with maroon-colored head and neck. Little Blue Heron (adult). No. 74.
      FF. Plumage streaked above and below with brown, buff, black and whitish. G, GG.
        G. Tail with 12 feathers. Black-crowned Night Heron (immature). No. 76.
        GG. Tail with only 10 feathers. Bittern. No. 68.
    EE. Smaller; wing 8 inches or less. Green Heron. No. 75.
AAA. Small; wing less than 6 inches, culmen less than 2 inches. H, HH.
  H. Under parts buff or buffy-white streaked with darker. Least Bittern. No. 69.
  HH. Under parts chestnut or rufous. Cory's Bittern. No. 70.

68. Bittern. Botaurus lentiginosus (*Montag.*). (190)

Synonyms: American Bittern, Stake Driver, Thunder-pump, Poke, Marsh Hen, Indian Hen, Bog Bull.—Ardea lentiginosa, Mont., 1813, Nutt., Aud.—Ardea minor, Wils., 1814. —Botaurus minor, Coues, 1872.

Plates V and VI.

The combination of the brown, buff and black plumage with green legs, yellow eyes and the size of a hen is generally sufficient to identify this bird.

Distribution.—Temperate North America, south to Guatemala, Cuba, Jamaica, and Bermuda; occasional in the British Islands.

One of the most abundant of our waders, and well known to every gunner who hunts snipe or ducks. Unfortunately the bird is large enough to tempt most juvenile shooters, and so thousands of these harmless and picturesque birds are killed every year for no useful purpose whatever. Unlike many of our herons it neither roosts, nests, nor feeds in flocks, but is seen singly, or at most in pairs, during its stay with us. Arriving from the south as soon as the frost is out of the ground, sometimes even earlier, and lingering at least occasionally until the marshes freeze up again, it is well known to every observant citizen who travels much over Michigan roads.

Its voice is unique, the names "Thunder-pump" and "Stake-driver" being attempts to indicate two of its commoner notes. These notes are often called "booming" which is the term regularly applied to the note of the European Bittern, but the term seems hardly applicable to the call of our bird. Good descriptions of the notes themselves and of the contortions of the bird while uttering them may be found in several of our standard works, one of the best descriptions probably by Bradford Torrey.

This bird's plumage offers one of the best illustrations we have of protective coloration, the brown, black and buff-streaked plumage harmonizing so perfectly with the dead or dying marsh vegetation among which it is found spring and fall, that the bird is wellnigh invisible even when standing fully exposed. Moreover the bird takes advantage of its color and puts itself in such attitudes as will favor the illusion, one of its favorite positions being erect with legs, body, neck and bill all in the same line, the bill pointing directly to the sky. It often assumes this postiion in alighting and will sometimes retain it for several minutes, when it will suddenly relax, taking the ordinary appearance of a heron, and proceeding to look for its food.

The nest is made of grass, weed-stalks, twigs, etc., and placed on the ground, among reeds, flags or bushes, and usually in marshy places; the eggs three to five are "pale olive drab, or pale isabella color, averaging 1.88 by 1.43 inches" (Ridgway). According to some writers the nest is placed commonly on bushes and at a height of several feet from the ground, but we have never seen or heard of a nest so placed.

Its food is of the most varied character, including animal matter of almost every description, but no seeds, berries or other vegetable materials. We have taken from its stomach fish, frogs, mice, snakes, tadpoles, crayfish, snails, and a great variety of aquatic insects, while Prof. Aughey of Nebraska has recorded one from Grand Island, Nebraska, killed in September, 1873, which had 16 grasshoppers in its stomach.

TECHNICAL DESCRIPTION.

Forehead and crown brown, darkest in front, where it is mixed with blackish; chin white or creamy-white, divided by a narrow median brown stripe; side of neck with a conspicuous patch of glossy black, dull or slaty in some cases and bordered above by clear buff; under parts from neck to tail pale buff with broad streaks of light brown, each streak minutely mottled with darker brown or black; back and scapulars heavily mottled with buff, brown and black, the buff predominating; primaries light bluish slate, tipped with brown, their shafts black. Bill mostly yellow, the culmen dusky; legs and feet pale green; iris bright yellow. Sexes alike, and young quite similar, but autumnal specimens darker, browner, and more richly colored, spring specimens having a paler bleached appearance. Length 24 to 34 inches; wing 9.80 to 12; culmen 2.50 to 3.20; tarsus 3.10 to 3.85.

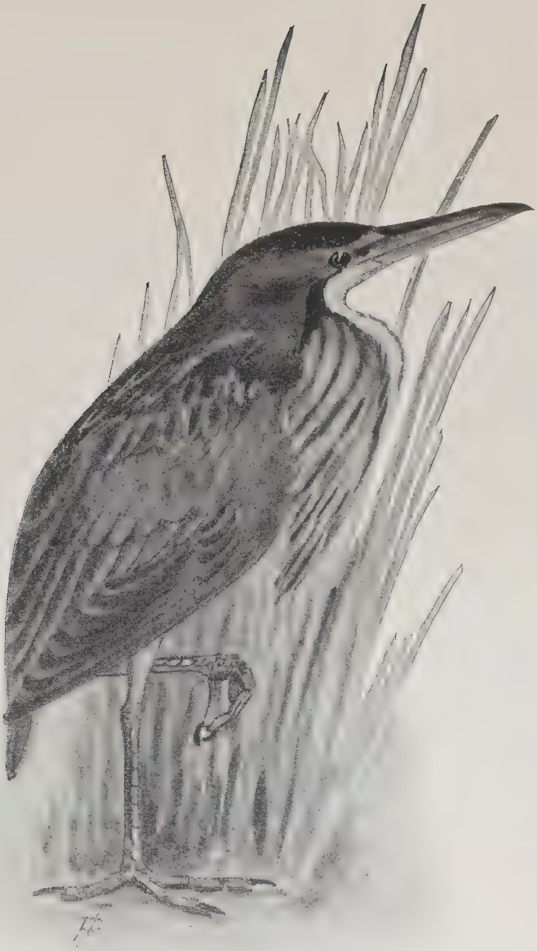

Plate V. Bittern.

From drawing by P. A. Taverner. (Original.)

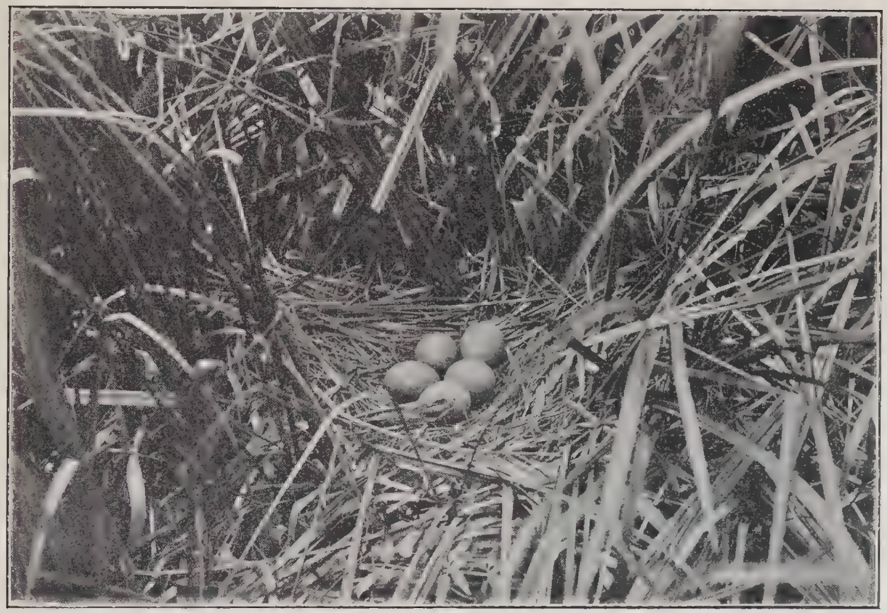

Plate VI. Nest and Eggs of Bittern.

From photograph by Thos. L. Hankinson. (Original.)

69. Least Bittern. Ixobrychus exilis (*Gmel.*). (191)

Synonyms: Dwarf Bittern, Little Bittern, Least Heron.—Ardea exilis, Gmel., 1789, Wils., Nutt., Aud. and others.—Ardetta exilis, Gundl., Baird, Ridgw., Coues, and most recent authors.

Figure 32.

Known from all but the next (which is extremely rare) by its diminutive size—a veritable pigmy among the herons, its body hardly heavier than that of a Robin.

Distribution.—Temperate North America, north to the British Provinces and south to the West Indies and Brazil. Less common west of the Rocky Mountains; on the Pacific coast north to northern California.

This tiny bittern or heron is really an abundant bird in all suitable places in the state, but owing to its small size, peculiar haunts, and protective coloration, it is seldom seen unless sought for especially. It frequents the wetter marshes, particularly those covered in large part with heavy growths of cattails, wild rice, and reeds (Phragmites). Occasionally it is found in meadows which are not actually flooded, or in the fringe of brush and water plants bordering a quiet stream, but those are exceptional cases and it is never numerous in such places. Even where it is abundant the explorer who goes floundering and crashing through the thick flags is not likely to see it unless he stumbles upon the nest, or by accident frightens the bird so thoroughly as to compel it to take flight. Ordinarily when threatened the bird selects a favorable place, grasps a twig or flag stem, stretches head, body and legs into one straight line, and remains immovable—and practically invisible—until the danger is past.

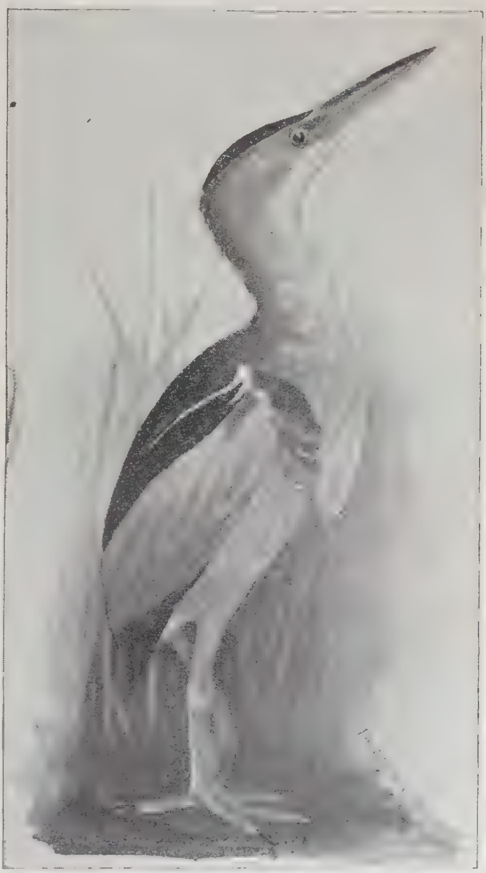

Fig. 32. Least Bittern.
From Bull. Mich. Ornith. Club. (By courtesy of P. A. Taverner.)

The nest is a slight platform or shallow saucer of twigs, sedges and grasses, in a tussock or low bush, or on a mat of broken down flags, always over or near the water. The eggs, three to six (usually four), are bluish-white or pale blue, unspotted, closely resembling those of the Yellow-billed Cuckoo, and averaging 1.20 by .93 inches.

This species when disturbed rises with a good deal of awkward flapping, much like most other herons, but makes fair speed when once under way. Apparently it migrates mostly by night, and it is one of the birds often killed by flying against wire fences, telephone and telegraph wires. We do not know that its food differs much from that of the other herons.

In suitable places Least Bitterns are extraordinarily abundant, but the numbers vary much in the same locality from year to year. On Chandler's Marsh, Ingham county, we have known two collectors working together to find more than 20 nests containing eggs, and nearly as many empty ones, during a day's search. According to Dr. R. H. Wolcott many false nests or "roosts" are constructed in the vicinity of the one in which the eggs are laid. In the southern half of the state most of the eggs are laid between June first and 15th, and we have no reason to suppose that more than one brood is reared in a season.

TECHNICAL DESCRIPTION.

Adult male: Top of head, back, scapulars and tail deep greenish-black; the scapulars margined on the outer edge by a pale buff stripe; sides of head and neck buff, deepening to chestnut along the black cap and down the back of the neck; a brownish black patch on each side of the breast in front of the bend of the wing; entire under parts from bill to tail whitish or very pale buff, many of the feathers with narrow dark brown shaft-lines, and a darker stripe down the middle of the neck and chest; lesser wing coverts and some of the others light buff, but the greater coverts, tertiaries, and outer vanes of most of the secondaries, rich chestnut; primaries dark slate color. Bill brown along the ridge, yellow along the cutting edges; legs and feet greenish-yellow; iris bright yellow. Adult female: Similar, but top of head dark brown instead of black, back and scapulars lighter brown, the buffy stripe much wider than in male; the under parts darker buff and more heavily streaked with brown. Immature: Similar to the adult female, but most of the back feathers buff-tipped.

Length 12 to 14 inches; wing 4.30 to 5.25; culmen 1.60 to 1.90; tarsus 1.50 to 1.75.

70. Cory's Bittern. Ixobrychus neoxenus (*Cory*). (191.1)

Synonyms: Cory's Least Bittern, Cory's Dwarf Bittern.—Ardetta neoxena, Cory, 1886, and most subsequent authors.

Figure 33.

Precisely like the preceding in size and proportions, and very similar in color, but with much more chestnut, the entire under parts being of this color, more or less mixed or shaded with black.

Distribution.—Originally discovered in Florida, in the Everglades, where all the earlier specimens were taken. Subsequently 16 specimens were taken near Toronto, Ont., one was taken in Wisconsin, one in Ohio, and at least two in Michigan. The first Michigan specimen was taken at Manchester, August 8, 1894, by L. Whitney Watkins (Auk, XII, 77), the second by Jesse Craven, at St. Clair Flats, May 14, 1904. Very likely the distribution of this species will prove to be the same as that of the preceding, and several ornithologists have suggested that Cory's Bittern may prove to be simply a color phase of the Least Bittern. Almost nothing is known as yet in regard to the habits of this bird, but what there is agrees closely with what we know of the other species.

The nest has been found but twice, once by J. F. Menge, at Lake Flirt, near Fort Thompson, Florida, June 8, 1890, containing four young birds (Auk, VIII, 309); and once at Toronto, Ont., Canada, June 15, 1898, where Mr. George Pierce, while collecting in Ashbridge's marsh, took a female from her nest. This was simply a mass of last year's reeds and contained one egg. The female, which was killed, contained another fully developed egg which agreed perfectly in size and color with the one found in the nest. Mr. James H. Fleming of Toronto, who examined the eggs, states that their color is much darker than average eggs of A. exilis, though he has seen a single set as dark (Auk, XVIII, 106). The eggs found in the nest measured 1.30 by 1.00 inch.

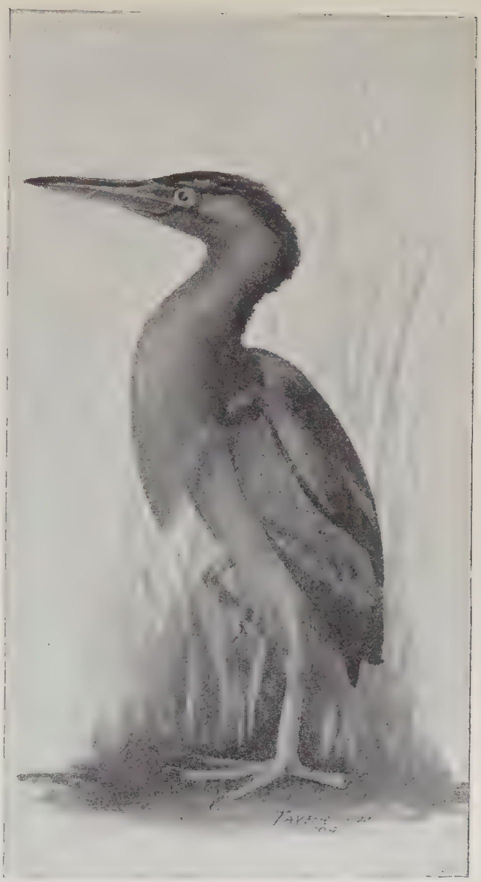

Fig. 33. Cory's Bittern.

From Bull. Mich. Ornith. Club. (By courtesy of P. A. Taverner)

TECHNICAL DESCRIPTION.

Adult male: Crown, back of neck, inter-scapulars, rump, tail, bend of wing, and under tail-coverts, glossy black; front of neck, abdomen, sides, and flanks, chestnut more or less mixed or shaded with smoky black, especially on the sides and flanks; primaries slate-color without light tips; outer secondaries gray without reddish tips, inner secondaries black; median wing-coverts chestnut, greater wing-coverts blackish-gray, the inner ones with chestnut tips; no buffy margin on the outer edge of scapulars. Adult female: Similar to adult male, but the crown dull blackish instead of glossy black, and the back brownish-black without gloss. Young birds appear to be similar to adults of the same sex, but many of the dark feathers may be light edged or tipped.

Length and other measurements practically the same as those of the Least Bittern.

71. Great Blue Heron. Ardea herodias herodias *Linn.* (194)

Synonyms: Common Blue Heron, Blue Crane, Crane.—Ardea herodias, Linn., 1758, and most authors.

Plate VII.

Largest of our herons, but not to be confused with the Sandhill Crane (Compare Fig. 40 and Plate 7). The latter has a comparatively blunt bill, partly bald head always without long plumes, and the plumage rather brownish or grayish; the Blue Heron on the contrary has a bill as sharp as a dagger, the head always well feathered and usually with elongated occipital plumes, while the general tone of the plumage is always bluish.

Distribution.—North America from the Arctic regions southward to the West Indies and northern South America. Bermudas; Galapagos.

The largest and probably, all things considered, the most frequently seen of any of our herons. While it feeds largely at night and is most active at morning and evening, yet it fishes more or less all through the day, and may be seen quietly watching or slowly walking along the edges of pond or stream at almost any time. It is rather wary and hard to approach, but quickly learns to avoid dangerous places and to know those where it is safe. Its height enables it to look over the tops of the tallest grass and it seldom becomes so absorbed in its pursuit of fish or frogs as to allow the hunter to come within shooting distance, unless indeed the murderer is armed with a rifle.

The Blue Heron feeds mainly on fish and frogs, but also eats immense numbers of crayfish, small snakes, salamanders, insects (among them grasshoppers), meadow mice, and almost anything of an animal nature. So far as we know it never eats vegetable substances of any kind.

It breeds almost always in communities, placing its bulky nest of sticks and twigs on the highest branches of swamp trees, often selecting those which are dead. Sometimes several nests are placed on the same tree, and frequently 150 to 200 nests may be seen in a single heronry. The same place is resorted to year after year unless the birds are seriously disturbed. Probably every county in the state has, or recently has had, one or more of these heronries, but as the timber has been cut off and the swamps and marshes have been drained the birds have been driven from their nesting places until they are now found only in the more favorable spots. They are still far from rare however, and the location of more than twenty flourishing heronries of this species is known to us at present. The eggs are commonly three to five, bluish green, unspotted, and average 2.50 by 1.50 inches. The same nests are repaired and used year after year, and the eggs are laid rather early, in Kalamazoo county by the middle of April, and probably by the first of May in the northern part of the state.

This species arrives from the south from the middle to the end of March and remains usually through October, while single individuals linger occasionally much later. One was killed in the streets of Lansing by a policeman, December 23, 1897.

TECHNICAL DESCRIPTION.

Adult in breeding plumage: Forehead, crown, chin, and most of sides of head pure white; a heavy black stripe over each eye, uniting in a black drooping crest on the occiput where the longest feathers reach a length of 8 or 9 inches; upper parts, including most of wing-coverts and secondaries, light slaty blue; most of back feathers (scapulars and interscapulars) elongated into bluish or creamy-white slender tips; throat and breast grayish-white, or brownish-white, heavily streaked with black, the feathers of the lower neck with elongated narrow white or buffy tips; a large deep black patch, with some white, on each side of the breast; belly pure black with some white streaks; under tail-coverts pure white; thighs (tibiæ) and bend of wing chestnut; primaries black. Bill yellow, darker on culmen; iris yellow; legs and feet black. After the breeding season the occipital plumes are shed and the plumage becomes duller and grayer. Sexes alike. Immature: No long plumes; no white on the head, the entire crown being blackish; chestnut markings paler or wanting; upper parts dull gray, often rusty; under parts streaked with ashy and blackish. Length 42 to 50 inches; wing 17.90 to 19.85; culmen 4.30 to 6.25; tarsus 6 to 8.

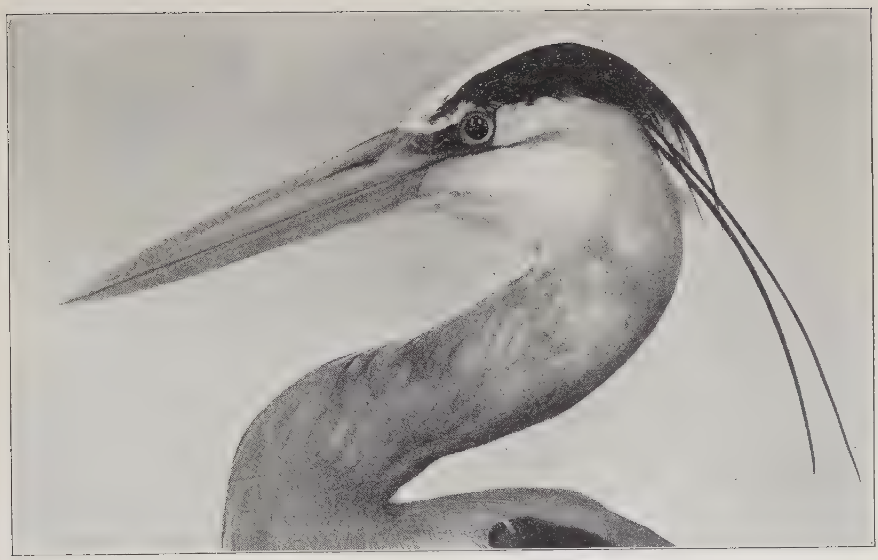

Plate VII. Great Blue Heron.

From photograph of mounted specimen. (Original.)

72. Greater Egret. Herodias egretta (*Gmel.*). (196)

Synonyms: Great White Egret, American Egret, White Egret, (sometimes erroneously White Heron or Great White Heron).—Ardea egretta, Gmel., 1788, Wils., Nutt., Aud., and others.—Herodias egretta, Gray, 1849, Baird, 1858, Coues, 1882.

The large size and pure white color are distinctive.

Distribution.—Temperate and tropical America, from New Jersey, Minnesota and Oregon south to Patagonia; casually on the Atlantic coast to Nova Scotia.

This large and beautiful bird is by no means common in any part of the state, but its snow white plumage, large size, and the fact that it frequents open marshes and mud flats makes it likely that a large part of the few individuals which occur in the state are seen and reported if not actually killed. As mentioned later it is possible that the species formerly bred or may do so now occasionally in the southern part of the state, but its normal nesting grounds are farther south and nine-tenths of the Michigan records for the species are in July, August, and early September. Occasionally several species of herons wander considerably north of their breeding grounds after the nesting season, and this habit is well marked in the case of the Greater Egret.

Our records for the state are as follows: One shot at St. Clair Flats about 1886, and in possession of a Frenchman living on the Canadian Flats (Swales). "Three or four have been shot near Plymouth during my recollection; one of these is now in my possession. All were taken during the months of July and August" (Purdy). A specimen in the Broas collection said to have been taken in the vicinity of Belding; now in the Agricultural College Museum. A specimen in the collection of the Monroe Marsh Club, taken at least twenty years ago and mounted by Sauvage. The latter thinks that he stuffed this specimen in 1882. Examined March 1, 1905 (Barrows). Mr. James Gunsolus, the present Keeper of the Monroe Marsh Club, says that he has never seen this species in the ten years or more of his connection with the club. A specimen taken on Saline River, Washtenaw county, August 15, 1877, one of four seen (Covert). A male taken July 12, 1886, near Ann Arbor, and another (female) taken July 22, 1888 in the same region, both by Covert. A specimen taken April 14, 1877 in Kalamazoo county, and in the collection of G. B. Sudworth (Gibbs). Another specimen, shot by William Glover on the Kalamazoo River, July 9, 1886, and now in the collection of the Michigan Agricultural College (Barrows). Dr. Gibbs writes "Every few years I hear of a number of these birds being seen about Kalamazoo. They are never numerous at any time, and I have not in my life seen half a dozen individuals all told." A specimen taken September 10, 1881, near Saline, Mich. and mounted by Norman A. Wood of Ann Arbor. Mr. Jason Nichols of Lansing saw four "White Herons" in that vicinity in the summer of 1883 and they probably belong to this species. There are two mounted specimens in the Barron collection at Niles, without data, but probably local.

We have been told of specimens believed to be Greater Egrets, seen or taken, in five or six other places in the state, but have not been able to verify the statements. According to Amos Butler, this species formerly bred in some numbers in the Kankakee Marshes in northern Indiana (Proc. Ind. Acad. Sci. for 1897). In his Birds of Indiana Mr. Butler has the following: "Breeds in some numbers locally in the northern part of the state (Indiana), and the lower Wabash Valley, in situations similar to those occupied by the Great Blue Heron, and generally associating in the same colony with them. For many years they have been known to breed in Knox and Gibson counties. We know that it still breeds in some, and did very recently in all, of at least six or eight of the counties in northern Indiana; also that it is very rarely indeed observed in its northward migrations before breeding time. This indicates that these herons migrate by night. Mr. McBride says that at the heronries at Golden Lake, Steuben county [which borders Michigan], for several years, he often saw a few of these among the many Great Blue Herons, and while satisfied they nested, he could not determine which nest was theirs. Mr. Woodruff says "Mr. Chas. Eldridge found this bird breeding at Kouts, Porter county, Illinois, May 1885, and took a large number of their eggs. He found their nests in the same trees with those of the Great Blue Heron. He adds that he visited the heronries in June, 1896, and did not see a single specimen of the White Egret" (Birds of Indiana, 1897, 660).

According to Kumlien and Hollister the Greater Egret was a common bird on the larger marshes and swamps bordering the inland lakes and rivers of Wisconsin 25 to 50 years ago. "Of late years, thanks to barbarous plume hunters, it is rare, so rare at the present time that three or four individuals only visit Lake Koshkonong each year where hundreds were found thirty years ago during August and September. Young unable to fly were taken from a colony in a tamarack swamp near Jefferson in July 1863. It was found breeding with a large colony of Great Blue Herons to the westward of Two Rivers in June, 1880, also reported as nesting near Waukesha in 1866" (Birds of Wisconsin, p. 35).

I can add nothing personally to the life history of this species in Michigan. We know that its food is similar to that of the Great Blue Heron; that it nests in trees, building bulky nests of sticks, and laying three to five blue eggs, rather darker than those of the Great Blue Heron, and averaging 2.28 by 1.60 inches.

Southward, where the species formerly was very abundant and nested in large colonies, known as "rookeries" or "heronries," there was great variation in the position of the nests; sometimes these were placed in the tops of lofty trees, even 100 to 150 feet above the ground, at other times on low mangroves not six feet above the water, while other nests occupied intermediate positions (Baird, Brewer and Ridgway).

TECHNICAL DESCRIPTION.

Adult in breeding plumage: Entire plumage snowy white; a train or large bundle of long, dissected plumes falls from the middle of the back, their tips almost or quite touching the ground when the bird stands erect. Legs and feet black; bill yellow or greenish yellow. After the breeding season the long aigrette plumes are lost, but otherwise there is little change in the plumage. The young resemble the adults except for the absence of the long plumes. Length 37 to 41 inches; wing 14.10 to 16.80; culmen 4.20 to 4.90; tarsus 5.50 to 6.80.

73. Lesser Egret. Egretta candidissima candidissima (*Gmel.*). (197)

Synonyms: Little Egret, Snowy Egret, Common Egret, Snowy Heron, Little White Heron.—Ardea candidissima, Gmel., 1789, Wils., Nutt., Aud., and others. Garzetta candidissima, Bonap., 1855, Baird, Ridgw., Coues and most recent authors.

Figure 34.

Known by its small size, pure white color, and in the breeding season by the peculiar plumes known as "aigrettes."

Distribution.—Temperate and tropical America, from Long Island and Oregon south to the Argentine Republic and Chili, casually to Nova Scotia and southern British Columbia.

This species is much rarer in Michigan than the preceding. In fact its presence here must be considered merely accidental. Formerly it may have occurred regularly in the southern tier of counties, but there is little to indicate that such was the case. There are a few good records for the state. Mr. Norman A. Wood of Ann Arbor has a mounted specimen in his collection which he informs us was taken about four miles from Ann Arbor, on the Huron River, April 20, 1895. According to marginal notes in Mr. A. B. Covert's copy of Cook's "Birds of Michigan," he (Mr. Covert) took a specimen near Ann Arbor in June 1895, and "an adult male in full plumage, Aug. 17, 1874." He has also recorded the capture of a specimen at Ann Arbor, April 9, 1872 (Forest & Stream, VII, 10, 147). In his manuscript list (1894-95) however, he states that all specimens taken in the state so far as he knows have occurred in the month of August.

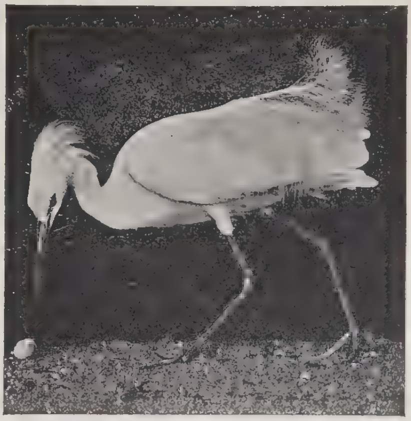
Fig. 34. Lesser Egret. From Bird Lore. (Courtesy of Frank M. Chapman.)

Dr. Gibbs states that "A specimen was collected in Kalamazoo county, August 6, 1877, and is in the collection of G. B. Sudworth. The species is not mentioned in the lists of Boies, Trombley, Miles, Steere, Hughes, Sager, Cabot or Stockwell." Mr. Amos Butler states that "It is a not common migrant and summer resident in the southern part of the state; breeding locally in the lower Wabash Valley. Mr. Ridgway says that it bred in Knox and Gibson counties, and J. A. Balmer says that although they varied in numbers from year to year they were quite constant summer residents in Knox county. In 1890 they were common about Swans Pond. This so far as known is their most northern breeding ground. After breeding they roam over the country, soon extending their journeys, as may be gathered by reported occurrences, into Michigan, Ontario, and Manitoba" (Birds of Indiana, 1897, 662). Kumlien & Hollister say "A rare and irregular visitor from the south during August and September. Of late years very rare. We have never been able to trace a capture of the Snowy Heron north of Milwaukee, Madison, and LaCrosse" (Birds of Wisconsin, p. 35).

This bird is said to migrate by day as well as by night, and it usually travels in compact flocks, often of fifty or even one hundred individuals. In Florida, where it formerly nested in abundance in low trees, it laid three or four eggs, which are similar in color to those of the other herons, but possibly a little greener. The eggs average 1.68 by 1.34 inches.

The history of the persecution of this bird in the Gulf states is very sad reading. Formerly one of the most abundant of water birds it has been followed from place to place and driven from the more accessible nesting places into the most impenetrable swamps, until at present it is with difficulty that an undisturbed heronry of this species can be found. While the plume hunter is directly responsible for this, the demands of fashion stand back of it all, and the lax legislation which has permitted the slaughter must of course bear its share of the blame. The "aigrettes" or plumes so much sought after are found in perfection only during the nesting season, and in order to obtain them the parent birds are shot and their backs skinned at their nesting places, leaving the young to perish miserably from starvation. Anyone wishing to learn the extent and details of this abominable business should read Educational Leaflet No. 7 of the National Committee of Audubon Societies, and the annual reports of Mr. William Dutcher, the Chairman of this National Committee.

TECHNICAL DESCRIPTION.

Adult in breeding plumage: Entirely white; a train of aigrette plumes growing from the middle of the back (interscapulars), their recurved tips extending about even with the tip of the tail, sometimes a little beyond; legs black, feet bright yellow in strong contrast; bill black, more or less yellow about the base. After the breeding season the long plumes are shed, but there is no other change. The young resemble the adults except in the long plumes. Length 20 to 27.25 inches; wing 8.20 to 10.50; culmen 2.08 to 3.75; tarsus 3.15 to 4.50.

74. Little Blue Heron. Florida cærulea *Linn.* (200)

Synonyms: Blue Egret.—Ardea caerulea, Linn., 1758, Wils., Nutt., Aud.—Florida caerulea, Baird, 1858, and most recent authors.

Recognizable always by the size and peculiar coloration; often the young are mostly white, but the tips of the primaries are always slaty blue, and the legs and feet greenish yellow in the young, so that they could hardly be confused with the Lesser Egret, which they resemble closely in size and proportions.

Distribution.—Eastern United States, from New Jersey, Illinois and Kansas, southward through Central America and the West Indies to Guiana and Colombia; casually north on the Atlantic cost to Massachusetts and Maine.

This must be considered merely a straggler in Michigan and we have only a single unquestionable record, that of a full plumaged bird in the dark phase killed near Detroit May 2, 1882, by Mr. William S. Smith, 140 Grand River Ave., who has the mounted specimen in his possession still.*

Dr. Gibbs states (MS. notes) that Dr. Atkins took a specimen in Ingham county, but Dr. Gibbs did not personally verify this statement, and I have been unable to get any confirmation of it. The statement appears not to have been published by Dr. Atkins, but occurred in a letter or manuscript which is not now to be found. In Covert's manuscript list of 1894-95 we find the statement "One specimen obtained at Geddes [near Ann Arbor], in May, 1876, by the late Dr. Joshua Jones of Chicago, Ill., formerly of Ann Arbor. That specimen is still (1895) in what remains of his collection at Ann Arbor." We have been unable to verify this record.

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* Auk XXVI, 1909, 83.

Four specimens were taken at or near Aylmer, Ont., an inland town nine miles north of Lake Erie, in the summer of 1901 (Auk, XIX, 94), and there are several records for the species in Ohio (Auk, XVIII, 392) and Wisconsin (Kumlien and Hollister, p. 36). It was formerly abundant along the lower Wabash Valley in Indiana, where it remained all summer and nested (Butler, Birds of Indiana, 1897, p. 664).

In Florida and the Gulf States, where it is an abundant species, it is said to feed mostly by day, to be always found in flocks, and to nest in communities, placing the nest of sticks on bushes or low trees in or very near the water. The eggs are three or four, blue, unspotted, and average 1.73 by 1.28 inches.

The immature birds, white or largely white, are often mistaken for White Egrets, and from the fact that these are commonly found associated with the blue adult birds, although flocks of either color are also found by themselves, the adult birds are often called Blue Egrets. But these birds never develop the slender and beautiful "aigrette" plumes, and consequently are not in demand by the plume hunter. As a result the species is still fairly abundant over large areas in the south where the Egrets have been almost entirely exterminated.

TECHNICAL DESCRIPTION.

"Adult with scapular and jugular plumes elongated, narrowly lanceolate, compact-webbed; occipital plumes slender, only a few of them much elongated. Color of adult usually uniform dark slate blue, with maroon-colored head and neck, but not unfrequently 'pied' with white, or even almost wholly white, with bluish tips to longer quills. Young usually pure white, with longer quills (primaries) tipped with slate-blue.

"Length 20 to 29.50 inches; wing 9 to 10.60; culmen 2.70 to 3.30; tarsus 3.15 to 4." (Ridgway)

75. Green Heron. Butorides virescens virescens *Linn.* (201)

Synonyms: Green Bittern, Little Green Heron, Poke, Fly-up-the-creek.—Ardea virescens, Linn., 1758, Wils., Nutt., Aud., and others.—Butorides virescens, Bonap., 1855, Baird, Ridgw., Coues and most recent authors.

Figures 35, 36, 37, 38.

The measurements and general green color of the back and wings serve to separate this heron from any other. It is smaller than any other member of the family except the Least Bittern and Cory's Bittern.

Distribution.—Temperate North America, from Ontario and Oregon southward to Columbia, Venezuela, and the West Indies. Bermuda.

This perhaps is the best known of the smaller herons in Southern Michigan, but it does not seem to extend far northward. It is abundant in

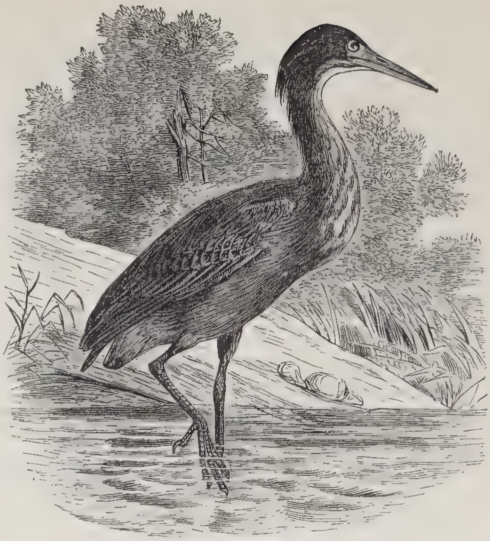

Fig. 35. Green Heron.
From Baird, Brewer and Ridgway's Water Birds of North America. (Little, Brown & Co.)

suitable places as far north as Port Huron, Owosso, Ionia and Grand Rapids, but north of this latitude it becomes infrequent or unknown. Mr. Newell A. Eddy states that it has not been taken in Bay county so far as he knows. Dr. Dunham took a single specimen in Kalkaska county, May 2, 1898, but says it is not common there. Kneeland records it for Keweenaw Point in his list of 1859, and Major Boies reported a single one seen on the St. Mary's River (Hay Lake), in Chippewa county, but these are the only reports from the Upper Peninsula.

The Green Heron enters the state from the south about the first of May, the exact date varying about a week either way according to season and locality. Nesting begins before the middle of May, and from the fact that occupied nests are occasionally found in July it seems likely that a second brood is reared sometimes.

It gets its common name of "Fly-up-the-creek" from its abundance along the wooded shores of our slow streams and the manner in which it will keep ahead of a boat, making short flights of 50 to 100 yards each time the boat gets too near, and after such a flight usually alighting in a tree or bush. Unlike most of our herons it does not seem to be at all social, and is never found feeding in flocks, but is seen singly or more frequently in pairs. I once saw five individuals along the shores of a muddy pond of a couple of acres, but this was exceptional. It is rather crepuscular in its habits, feeding and flying mostly at morning and evening, but frequently heard during moonlight nights, and often abroad all day during

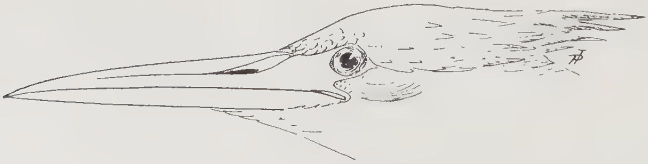

Fig. 36. Green Heron.

Head, showing occipital crest and naked lores. (Original.)

cloudy and rainy weather. Its loud and unmusical squawk suggests at the same time the croak of the bull-frog and the call of a young crow.

The nest is carelessly built of twigs and small sticks, usually placed from eight to thirty feet from the ground and not necessarily close to water; we have known it to be built in orchard trees and shade trees at least a quarter of a mile from water, although it is more often found in the low trees and swampy thickets which directly border streams and ponds. The eggs are three to six, blue, unspotted, and average 1.50 by 1.14 inches.

Ordinarily the nests are widely scattered, but more rarely a small colony of three to six pairs may be found. Dr. Morris Gibbs visited five nests of this kind found "in willow bushes near a creek, from 4 to 10 feet from the ground" in Kalamazoo Co., in May, 1878.

The food is varied, but in addition to the usual fish and frogs it eats large numbers of insects, not always aquatic. One taken at New Haven, Conn., "had the stomach filled principally with little salt-marsh minnows, and in addition contained an eel, some kind of a water bug, several grasshoppers and two spiders" (Buck, Nidiologist, III, 37). One killed at Booneville, N. Y., had the stomach "filled with grasshoppers."

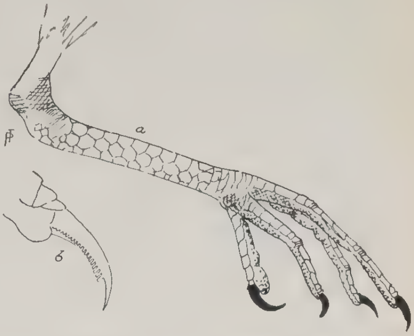

Fig. 37. Foot of Green Heron. Showing partly bare tibia and pectinate middle claw. (Original.)

TECHNICAL DESCRIPTION.

Adult: Entire top of head dark lustrous green, blackish in front; back and upper surface of wings and tail green of nearly the same shade as top of head, the elongated, narrow interscapulars often with a bluish-white gloss and the slender shafts pure white; most of the wing-coverts narrowly margined with yellowish-white; chin and upper throat white, scarcely streaked; median line of middle and lower throat striped brown and white; entire sides of head and neck rich dark chestnut with a purplish gloss at the back; remainder of under parts smoky-gray; primaries slaty-blue; iris yellow; bill brownish-black above, greenish-white below; legs and feet green. Sexes alike. Young somewhat like the adult but with little clear chestnut or green; everywhere streaked with light and dark, and the wing-coverts with much broader light edgings than in the adult. Length 15.50 to 22.50 inches; wing 6.30 to 8.00; culmen 2 to 2.55; tarsus 1.75 to 2.15.

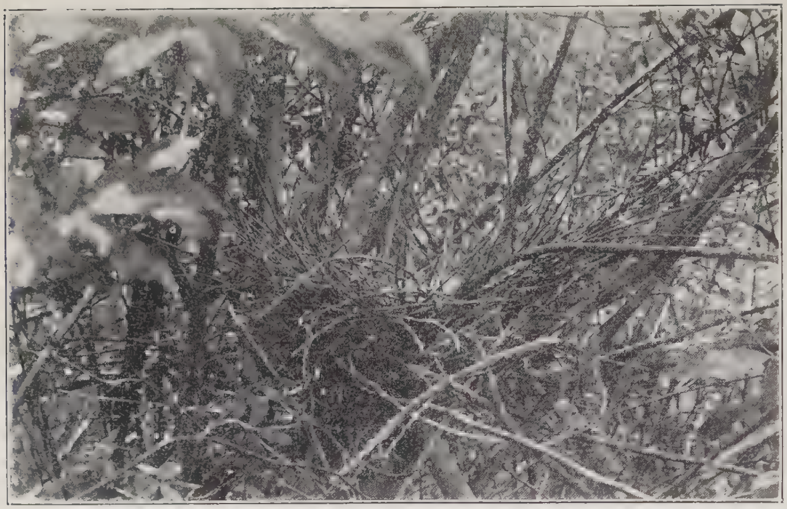

Fig. 38. Nest of Green Heron.

From photograph by Thos. L. Hankinson.

76. Black-crowned Night Heron. Nycticorax nycticorax naevius (*Bodd.*). (202)

Synonyms: Night Heron, Quawk, Squawk.—Ardea nævia, Bodd., 1783.—Botaurus nævius Briss., 1760.—Nyctiardea grisea var. nævia, Allen, 1872.—Nyctiardea gardeni, Baird, 1858.

When adult never to be mistaken for anything else, the green-black crown and back, white underparts, thread-like occipital plumes, and brilliant red eyes, forming a unique combination. The immature bird, gray-streaked and with yellow eyes, might be mistaken for the common Bittern which has about the same size and general appearance, but the tints of the Bittern are much browner and the plumage never shows the white spots and streaks of the Night Heron.

Distribution.—America, from Ontario and Manitoba southward to the Falkland Islands, including part of the West Indies.

This odd and beautiful heron seems to be nowhere common in Michigan. It has been taken here and there throughout the lower half of the Lower Peninsula, but always singly and at long intervals. Most of the specimens taken are young birds and found in late summer and early autumn. According to Swales (Birds of S. E. Mich., 1904) "It is now a rare bird and seldom recorded. * * * In 1904, May 5, one was taken at St. Clair Flats, and on July 16 I saw one near the River Rouge." Langille says that formerly it was "constantly seen at the Flats in summer, sometimes in large flocks, and no doubt bred in woods not far away" (Bull. Buffalo Soc. Nat. Sci. 1877, 39). Mr. T. L. Hankinson found it by no means uncommon about Walnut Lake, Oakland county, during the early summer of 1906, but no evidence of nesting was obtained.

We have no record of its breeding in the state. Boies states that "it is reported as breeding on islands in St. Mary's River, but I did not see one during my three seasons on the river" (Birds of Neebish Island). The report to which Major Boies refers is probably that given in Cook's Birds of Michigan by Hon. Chase S. Osborn of Sault Ste. Marie, but further inquiry has shown that the heronry on Espanore Island is tenanted only by the Great Blue Heron, and we have no reason to suppose that any colony of the Night Heron will be found so far north. It is rather remarkable that no colonies have been located in the state, but such appears to be the fact.

The species breeds ordinarily in large communities, often as many as 500 or 600 pairs nesting within the compass of a few acres. Usually it places its nests in low trees, but in Wisconsin it has been found nesting more than once on or near the ground in marshes. Nelson states that under such circumstances the nests are placed among the wild rice, but Kumlien and Hollister (Birds of Wisconsin, p. 36) state that they have always found the nest placed among the cane (Phragmites). When placed in trees the nest is composed almost entirely of sticks and twigs. The eggs are commonly three or four, clear blue, unspotted, and average 2.01 by 1.47 inches.

The species feeds singly, and mostly at night, and its food does not seem to differ materially from that of other herons.

TECHNICAL DESCRIPTION.

Adult: Forehead pure white, entire top of head, including the occiput, dark bottle green, almost black; entire back and scapulars of the same color, perhaps a little greener, the upper surface of wings and tail uniform pearl-gray in strong contrast. From the long feathers of the occiput arises a slender, thread-like plume less than one-eighth of an inch wide and six inches or more in length, made of two or three pure white feathers laid one within the other; chin, throat, and entire under parts pure white; sides and back of neck shaded with ashy gray, as are also the sides of the breast and body. Bill mostly black; iris bright red; legs and feet yellow or greenish-yellow. Sexes alike. Young of the year entirely different; above, light grayish or buffy-brown, each feather with a triangular streak or spot of whitish; below pretty evenly streaked with light brown and white in nearly equal amounts, the chin and upper throat mainly white with few streaks. Iris yellow; bill and feet nearly as in adult. Length 23 to 26 inches; wing 11 to 12.80; culmen 2.80 to 3.10; tarsus 3.10 to 3.40.

Order VIII. PALUDICOLÆ. Marsh-dwellers.

Family 21. GRUIDÆ. Cranes.

KEY TO SPECIES.

A. Tarsus 11 inches or more, plumage mostly white. Whooping Crane. No. 77.

AA. Tarsus 10 inches or less, plumage mostly slaty gray or brown. Sandhill Crane. No. 78.

77. Whooping Crane. Grus americana (*Linn.*). (204)

Synonyms: Ardea americana, Linn., 1758, Wils., 1814.—Grus americana of most subsequent authors.

The adult may be known at sight by its great size (decidedly larger than the Sandhill) and the pure white plumage with the exception of the black wing-feathers.

Distribution.—Interior of North America, from the fur countries to Florida, Texas and Mexico, and from Ohio to Colorado. Formerly on the Atlantic coast, at least casually, to New England.

This magnificent bird is now one of the rarest of our water birds east of the Mississippi River. Formerly it was not uncommon throughout the entire Great Lake region, and was seen singly or sometimes in small flocks by itself, occasionally associated with the Sandhill Crane. Its striking plumage and great size made it conspicuous wherever it appeared, and although well known it probably was never really abundant.

So far as we can learn there are no recent records for Michigan which are unquestionable. According to Covert (MS. List 1894-95) one was taken at Geddesburg, Washtenaw County, Mich., June 8, 1877. In Covert's copy of Coues Key a marginal note says "Three specimens, Brighton, Mich., April, 1882, Chas. Cushing." Mr. Covert tells me that he remembers the fact of their capture, but nothing more. We have not been able to find a Michigan specimen of this bird in any collection. The record by L. W. Watkins of Manchester (Cook's Birds of Michigan, 1893, 2d ed. 52) doubtless relates to the Greater Egret, which is large enough to be mistaken at a little distance for the Whooping Crane.

There is a record of one taken at Camden, Ontario, September 27, 1871 (McIlwraith, Birds of Ont., 1894, 116). In Indiana, according to Butler it is "A rare migrant; formerly more common. It has been known to breed in Central Illinois (Nelson), and clear Lake, Iowa (Cooke), and doubtless did so in Indiana. Mr. L. P. Myers says that in Lake county it is exceedingly rare. It was a summer resident, but the draining of the Kankakee marshes has driven it away. Mr. Timothy H. Ball also writes of their former occurrence in Lake county, that they were common, but not so abundant as the Sandhill Crane" (Birds of Ind., 1897,669). Kumlien and Hollister say "Thirty or forty years ago it was not rare to see a few among the enormous flocks of Sandhill Cranes during the October migrations, and even flocks composed entirely of this species. Of late years adults are exceedinaly rare, and the last record we have of a Wisconsin capture is October, 1878, when a fine old bird was shot in Green county, and sent to Thure Kumlien. Newspaper and other reports of flocks of 'White Cranes' and of specimens shot in various parts of the state of late years, refer to the Greater Egret and not to this species" (Birds of Wisconsin, 1903, p. 36).

The nesting habits are similar to those of the Sandhill Crane, the nest a rude structure of weeds and vegetable refuse on the ground, and the two eggs olive or olive buff spotted with brown and gray, and averaging 4.04 by 2.50 inches.

TECHNICAL DESCRIPTION.

Adult: Plumage entirely white, except the outer wing-feathers (primaries) which are black; top of head, lores and cheeks naked, usually reddish, and with a few scattered black "hairs." Sexes alike. Young of the year, similar, but many feathers with yellowish brown tips, often giving a rusty tinge to the entire plumage; the whole head feathered.

Length 50 to 54 inches; wing 22 to 25; culmen 5.35 to 5.80; tarsus 11 to 12.

78. Sandhill Crane. Grus mexicana (*Mull.*). (206)

Synonyms: Brown Crane, Upland Crane, Field Crane.—Ardea mexicana, Müll., 1776 —Grus pratensis, Bartr., 1791.—Grus fusca (part) Vieill., 1817.—Grus canadensis, Nutt., 1834, Baird, 1858, Coues, 1872, Ridgw., 1881.

Figures 39 and 40.

Comparison of the figures of the head of this species and that of the Great Blue Heron will enable the student to separate the two at a glance. The large size and general proportions make it impossible to confound the bird with anything else but the Blue Heron, and from this species it can be readily separated by the bald head and the gray or brown plumage, which is never blue at any age.

Distribution.—Southern half of North America; now rare near the Atlantic coast, except in Georgia and Florida.

Now that the Wild Turkey is extinct the Sandhill Crane probably is the heaviest wild bird found in the state, unless possibly the Whistling Swan sometimes equals it. It is a decidedly larger bird in every way than the Blue Heron, with which it is often confounded, and its weight is at least double

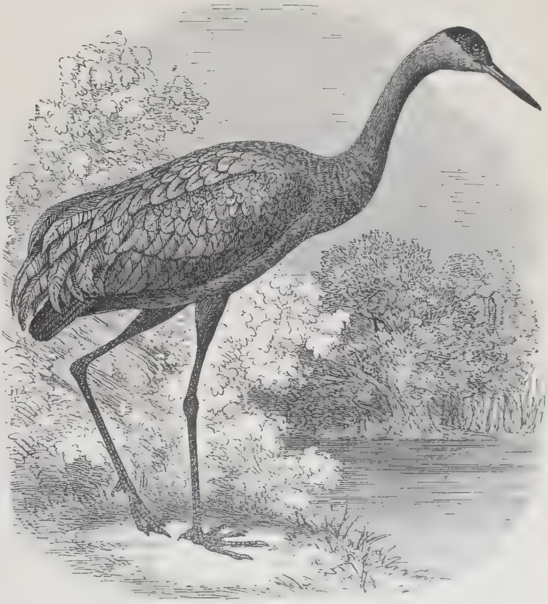

Fig. 39. Sandhill Crane.
From Baird, Brewer and Ridgway's Water Birds of North America. (Little, Brown & Co.)

that of the heron. Although it belongs with the waders, and is often found in wet places, it has little in common with the herons and frequents upland pastures and plowed fields as well as grain fields in preference to marshes and swamps.

Its food is decidedly unlike that of the herons, since during a large part of the year it feeds extensively on vegetable food, eating roots, bulbs, grains, berries, etc. as well as insects, frogs, lizards, snakes and mice. It is said to be especially fond of corn, which is taken from the shock, and in Nebraska Prof. Aughey found it feeding freely on grasshoppers. Occasionally it may prey upon fish, but this certainly is not a common food, and we do not know of an instance which has been observed.

While it migrates by night as well as by day it feeds mainly if not entirely during the day, in which respect again it is unlike most herons. Its flesh is excellent for the table, and it is hunted accordingly wherever it occurs.

Naturally watchful and suspicious it has become still more so through persecution, until in most parts of the state at the present time it can be approached only with the greatest difficulty and must be shot with the rifle if at all. In flight it carries the neck and legs stretched out to their full extent in line with the body, and squads or flocks are often seen flying in single file like ducks or geese. Its note is not easily described, but once heard is not soon forgotten. One writer likens it to the sound of a coarse cow-bell, another to the rattling of blocks and tackle on shipboard when getting up sail; still another says it resembles the creaking of a gate or windmill, while I never hear the note without thinking of the sound produced in trying to get water out of a wooden pump which has run down and been long out of use. When heard at a distance of a mile or more the notes are not unmusical, but at shorter distances they lose all charm for the sensitive ear.

The nesting habits are very variable in different parts of its range. In Michigan, so far as we can learn, the nest is invariably placed flat on the ground in rather open and extensive marshes, but usually on some small island or ridge of slightly higher ground where there is no danger of inundation. The nest itself consists of weed stalks, grasses and similar rubbish, not very deeply hollowed, and rather carelessly lined with grass. The eggs are invariably two, and are spotted and blotched with reddish brown or gray on an olive or pale buff ground. They average 3.98 by 2.44 inches.

In Michigan this species is now far from common. Twenty-five years ago it probably nested in almost every part of the state, and even ten years ago it was seen spring and fall passing north and south in small flocks in most parts of the state. Dr. Atkins of Locke, Ingham county, noted its arrival at that place in spring for 27 consecutive years. His earliest date was February 19, 1857, and the latest April 12, 1864. On 21 springs it appeared in March, and on 16 of these it first appeared between the 15th and the 31st. He found the nest with nearly fresh eggs on June 8, 1879. Until within eight or ten years the species has nested every season near the Agricultural College, and the eggs or young have been taken frequently. Since 1900 the nest has not been found here so far as I know, although a few of the birds have been seen passing northward in the spring. One or more pairs spent the summer of 1910 at Chandler's Marsh, just north of the College, and undoubtedly nested in the vicinity. They were not noted during the summer of 1911, but a squad of 4 or 5 fed there regnlarly during most of October.

Major Boies states that he noted but two of these birds during his stay of two years on Neebish Island in the St. Mary's River. Mr. L. Whitney Watkins believes that they still nest in parts of Jackson and Washtenaw counties, and Mr. Edward Arnold of Battle Creek has known of their nesting recently in several places in the southern part of the state. W. P. Melville states that he saw three adults and took a young one in the down on the plains south of Newberry (Upper Peninsula), Luce county, in 1903; Mr. Newell A. Eddy of Bay City reports seeing eleven on the marshes near Seney, Schoolcraft county, September 25, 1895, and was informed by residents that they occurred there every fall. Single specimens are taken here and there through the state occasionally now, but it seems certain that its numbers are decreasing steadily, and before many years in all probability it will desert the state altogether, seeking nesting places farther north and west where it can find greater security.

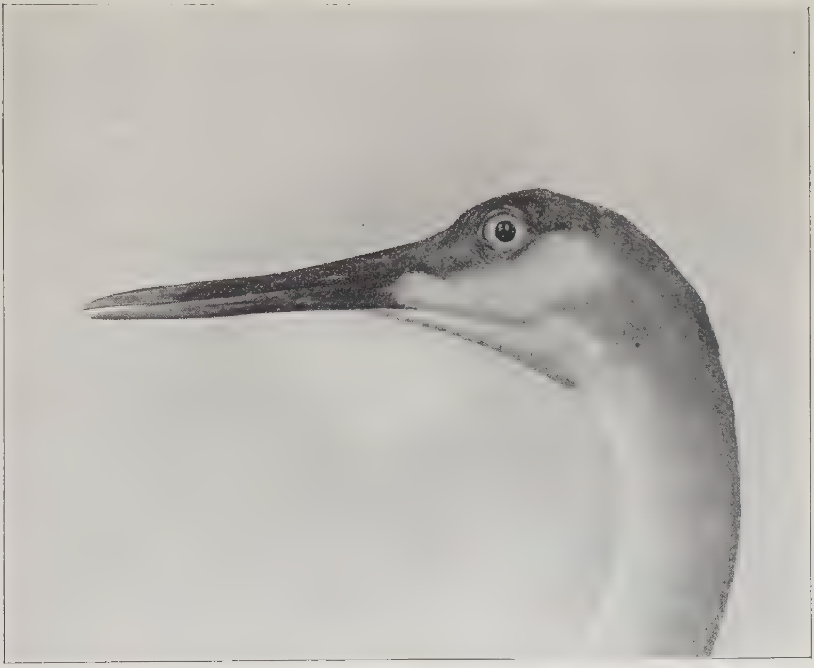

Fig. 40. Head of Sandhill Crane.
From photograph of mounted specimen.

The nesting date given above by Dr. Atkins would seem to be unusually late in view of the fact that Trombley records two fresh eggs taken in Monroe county, April 23, 1885, and L. J. Cole took two newly hatched young on Chandler's Marsh, Ingham county in May, 1898. Several writers state that the bird is an early nester, and we should infer that ordinarily the eggs were laid the last of April or first of May. Covert, however, records a nest found near Ann Arbor June 2, 1870 (Forest and Stream, VII, 10, 147), and we find among the notes of the late Percy Selous a record of a nest and two eggs at Burgess Lake, near Greenville, Montcalm county, June 30, 1894.

Mr. L. Whitney Watkins, of Manchester, has in his collection the skin of a Sandhill Crane which weighed 12½ pounds. It is one of two which were killed at Fay's Lake, Jackson county, about 3 a. m., August 29, 1893, while "roosting" in water eight inches deep on a bar in the lake.

TECHNICAL DESCRIPTION.

Adult: Head, crown, and sides of head to level of eyes, naked or thinly covered with small "hairs" (really minute feathers); chin, cheeks, and auricular region, pure white; rest of head and neck bluish gray, becoming browner on lower neck; rest of upper surface, including wings and tail, brownish gray, each feather margined or tipped with dull white, or, on the wing-coverts, with rusty-brown; under parts clear gray to brownish gray, mottled with whitish, each feather having a wide margin of grayish-white; primaries slaty-black with pure white shafts; tail-feathers ashy brown to nearly black. Bill and feet black; iris yellow. Sexes alike. Immature: Similar, but much browner, the upper parts, and especially the upper surface of wings, often mainly rusty-brown; reddish margins on many of the feathers all over the body. Length 40 to 48 inches; wing 21 to 22.50; culmen 5.15 to 6; tarsus 9.90 to 10.65.

Family 23. RALLIDÆ. Rails.

KEY TO SPECIES.

A. Forehead with a bony or membranous plate or shield. B, BB.
    B. Toes with conspicuous lobes or flaps. Coot. No. 85.
    BB. Toes without lobes or flaps. C, CC.
        C. Plumage mostly slate color, flanks with at least a few distinct white streaks. Florida Gallinule. No. 84.
        CC. Plumage mostly bluish-purple and olive-green, no white streaks on flanks. Purple Gallinule. No. 83.
AA. Forehead without trace of plate or shield. D, DD.
    D. Bill (culmen) more than an inch long. E, EE.
        E. Bill two inches or more, wing about six inches. King Rail. No. 79.
        EE. Bill less than two inches, wing less than four and one half inches. Virginia Rail. No. 80.
    DD. Bill less than an inch long. F, FF.
        F. Bill ¾ inch or more, wing 4 inches or more. Sora; Carolina Rail. No. 81.
        FF. Bill less than ¾ inch; wing less than 4 inches. Yellow Rail. No. 82.

79. King Rail. Rallus elegans *Aud.* (208)

Synonyms: Fresh-water Marsh Hen, Red-breasted Rail.—Rallus elegans, Aud., 1834 and most authors.—Rallus crepitans, Wils., 1813 (but not of others).

Figure 41.

The cinnamon breast, barred flanks, and red eye are common to this species and the Virginia Rail, the latter, however, being very much smaller. Compare the measurements.

Distribution.—Fresh-water marshes of the eastern United States, north to the Middle States, northern Illinois, Wisconsin and Kansas, casually to Massachusetts, Maine and Ontario.

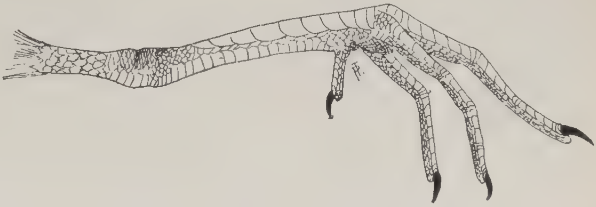

Fig. 41. Foot of King Rail. (Original)

In Michigan this species is confined apparently to the southern half of the Lower Peninsula, although it may occur as a straggler somewhat farther north. We have specimens taken near Saginaw Bay, and it has been found breeding at Grand Rapids. It is a common nester at St. Clair Flats, and is fairly abundant in the neighborhood of the Agricultural College, Ingham county, although far less common than either the Virginia Rail or the Sora. Like all the rails it is shy, secretive, and rarely seen unless specially looked for. Most of the specimens taken are killed in the fall while hunting quail or woodcock with a dog, and at such times the rails are often found on dry ground adjacent to marshes. It seems to migrate entirely by night and ordinarily is rather quiet during the day, probably like most of the rails feeding principally morning and evening, but more or less all through the night.

The nest is placed usually in long marsh-grass, but little elevated above the ground, and is made of grasses and weeds like most rail nests. The eggs vary in number from 6 to 16 and are commonly about 10. They are buffy or cream white rather heavily spotted and specked with red brown, and average 1.63 by 1.22 inches. They are most often found in southern Michigan from the middle of May to the middle of June. According to B. H. Swales "Some breed at Grassy Island, Detroit River, just below Detroit, but they are much more abundant at St. Clair Flats. A nest found July 9, 1896, contained 9 eggs of the King Rail, 8 eggs of the Virginia Rail, and one of the Sora. The bird seen to leave the nest was a King Rail" (Bull. Mich. Orn. Club, I, 32).

Undoubtedly the bird is much more common than it seems, yet Lower Michigan forms the northern limit of its breeding range and it certainly is one of the less common rails. Most of our correspondents call it rare, but along the eastern side of the state, from Monroe county to Saginaw Bay, it must be considered far from rare.

Its food is much like that of the Virginia Rail and consists of a mixture of animal and vegetable substances. According to Kumlien & Hollister "It occurs in much higher and dryer situations than any of the other rails, and often frequents stubble fields when not too far away from the marsh. We have found the esophagus literally crammed with oats, and in the latter part of summer and early fall the birds subsist largely on grasshoppers" (Birds of Wisconsin, p. 38). Prof. Aughey examined seven stomachs taken in Nebraska in August and October, 1874, and May 1875, and found locusts in every stomach, the number varying from 17 to 48. Each stomach contained also other insects and seeds (1st Rep. U. S. Entom. Com., App. 2, p. 56).

Owing to its nocturnal movements the dates of arrival and departure are somewhat uncertain, but it probably reaches Michigan early in May and leaves for the south during October, although individuals may linger until early November (Detroit, Nov. 5, 1905, Swales).

TECHNICAL DESCRIPTION.

Adult: Head and neck above olive brown; the back, including upper surface of wings and tail, a lighter shade of the same color, heavily streaked with umber brown and black; sides of head and neck reddish brown or cinnamon, this color continuing over the whole of the breast, which is unspotted; a white streak from the base of the bill above the eye, and a white spot below the eye; chin and upper throat pure white; sides and flanks black or brownish black conspicuously barred with pure white; belly nearly white; primaries dark brown, their coverts bright rufous; edge of wing white. Sexes alike. Immature: Similar. Downy young, uniform glossy black. Length 17 to 19 inches; wing 5.90 to 6.80; culmen 2.12 to 2.50.

80. Virginia Rail. Rallus virginianus *Linn.* (212)

Synonyms: Little Red-breasted Rail.—Rallus virginianus of authors generally.—Rallus limicola, Vieill., 1823.

Figure 42.

Very similar to the King Rail in everything but size, the present species being very much smaller.

Distribution: North America, from the British Provinces south to Guatemala and Cuba.

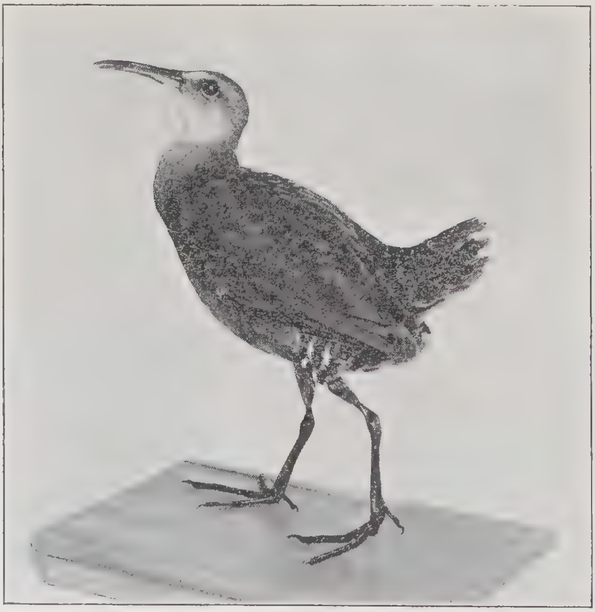

Fig. 42. Virginia Rail. From Mounted Specimen. (Original.)

Unlike the King Rail this species is found over the entire state and probably nests wherever found. It is, however, much more abundant in the southern half of the state than farther north, and probably in most parts of the Upper Peninsula it should be considered rather uncommon. S. E. White calls it rare on Mackinac Island; Major Boies saw only a few on Neebish Island, St. Mary's River, in the summer of 1893; and one was killed at Spectacle Reef Light, Northern Lake Huron, May 14, 1886. Throughout the Lower Peninsula it occurs generally wherever the conditions are suitable, but apparently it varies greatly in abundance in different places, and also at the same place in different years. In most places it seems to be less common than the Sora, but occasionally the reverse is true.

It frequents wetter ground than the King Rail, and I do not remember ever to have flushed one in a dry field. The nest is commonly built among reeds, rushes, or cattails, and sometimes is only a slight platform of dead leaves and grass, while at other times it is a deeply hollowed and compact nest around which the growing vegetation has formed a complete screen and sometimes even a complete roof. The eggs, 6 to 10 in number, are creamy or buffy white rather sparsely spotted with brown. They average 1.24 by .94 inches.

The food is a mixture of animal and vegetable substances, insects, worms, small crustacea, etc., forming the major part during the summer, but varied more or less with fruits, seeds, and grains whenever available. The bird swims easily, but seldom takes to the open water, preferring to run about on floating vegetation or jump from tussock to tussock while feeding, and seldom taking wing, at least during the day, unless surprised. The flight is feeble and fluttering at first, the heavy legs and feet dangling for a considerable distance, but when the bird has gained good headway the feet are stretched out behind, in the manner of herons, and the bird flies steadily and with considerable speed. It migrates entirely by night, and is one of the species frequently killed by flying against telephone and telegraph wires and wire fences. It is also frequently picked up under electric light towers, where, in company with scores of other migrants, it has met death during thick weather.

This bird is frequently killed by snipe shooters and is considered fair eating, although inferior to Wilson's Snipe.

William Brewster speaks of the notes of the Virginia Rail heard in May and June, as "a succession of grunting sounds not unlike those of a hungry pig. Although by no means loud, they have a penetrating quality which makes them carry to a considerable distance."

TECHNICAL DESCRIPTION.

Adult: Head and neck above brownish-black, faintly spotted with light brown; back, rump, and upper tail-coverts, black, streaked and spotted with pale brown; sides of head bluish ash; a whitish line from bill to upper eye-lid, and edge of lower eye-lid white; chin pure white; front of neck and breast cinnamon-brown, paler along the middle of the breast; sides and flanks black with narrow white bars; lesser wing-coverts bright chestnut; edge of wing white; under tail-coverts mixed black and white. Bill dark above, greenish-yellow below; legs and feet greenish; iris red. Sexes alike. Downy young, uniform coal black. Length 8.12 to 10.50 inches; wing 3.90 to 4.25; culmen 1.45 to 1.60.

81. Sora Rail. Porzana carolina (*Linn.*). (214)

Synonyms: Carolina Rail, Common Rail, Rail-bird, Ortolan.—Rallus carolinus, Linn., 1758, Aud., 1835.—Ortygometra carolina, Bonap., 1838, Aud., 1839.—Porzana carolina of most recent authors.

Plate VIII.

Adult: Readily known by the short, chicken-like bill, black face and throat, and barred flanks. The short bill separates it from any other common rail.

Distribution.—Temperate North America, breeding chiefly northward, but less commonly on the Pacific coast. Casually north to south Greenland. South to the West Indies and northern South America.

All things considered this is our commonest Michigan rail, nesting abundantly in suitable places all over the state, and frequenting almost all wet places except the overflowed woodlands which have neither underbrush nor grass. Their favorite haunts are the extensive marshes of cattails, wild rice, reeds and sedges, but a pair or two can almost always be found in any small cat-hole in the pasture or woods, and they frequently are found along the ditches and swales which border the highway, even when there are no large marshes within sight.

In general habits they are similar to the Virginia Rail, but in most places are more abundant and they also appear to be less shy and suspicious; at all events they are more often seen by the sportsman and the average pedestrian. They are decidedly noisy, their loud and not unmusical notes being one of the characteristic sounds of our marshes, most noticeable at evening, though often heard all night long. If one hides among the reeds, or merely sits quietly in his boat in a favorable spot, he is very likely to see one or more of these birds tripping lightly over the lily-pads or other floating vegetation, picking up insects, snails, or floating seeds, and occasionally fluttering up among the stems to catch an insect or reach a spray of wild rice. Mr. Chapman speaks of their ordinary note as a "clear whistled *ker-wee*, now and then interrupted by a high-voiced rolling *whinny* which, like a call of alarm, is taken up and repeated by different birds all over the marsh. They seem so absorbed by their musical devotions that even when calling continuously it requires endless patience and keen eyes to see the dull colored, motionless forms in places where one would not suppose there was sufficient growth to conceal them" (Handbook, 1904, p. 143).

The nest is similar to that of the other rails, sometimes well built, sometimes very carelessly, almost always, however, in vegetation which is growing directly in the water. The eggs vary from 6 to 15, and are buffy white of a much deeper shade than those of the Virginia Rail, and usually more thickly and heavily spotted with brown and purple. They average 1.32 by .95 inches.

This bird is commonly shot by sportsmen and is considered good eating. After it has become fat on wild rice at the south it is much sought after and is the "ortolan" of the Washington and Baltimore markets. The name is an absurd one, having been transferred to this bird from the Bobolink, which is now called Rice-bird in the same localities. The true Ortolan (Emberiza hortulana) is a European sparrow or finch about the size of our Bobolink and much prized as food in southern Europe.

TECHNICAL DESCRIPTION.

Adult: Face and median line of crown black; rest of upper parts olive brown, spotted with pure black, and streaked and dotted with white; sides of head and neck bluish ash, this color covering all the lower neck and the forepart of the breast; auricular region brown like the back; chin and median line of throat black; lower breast and belly nearly white, faintly barred with dusky; sides and flanks distinctly barred with black and white; sides of breast shaded with olive. more or less dotted with white; under tail-coverts white, washed with rufous. Bill bright yellow, feet green. Sexes alike. Immature: Similar, but lores and stripe over the eye brownish, the bluish ash of head, neck and breast replaced by light grayish brown. Downy, young, clear black with a tuft of orange colored bristly feathers on the breast. Length 7.85 to 9.75 inches; wing 4.15 to 4.30; culmen .75 to .90.

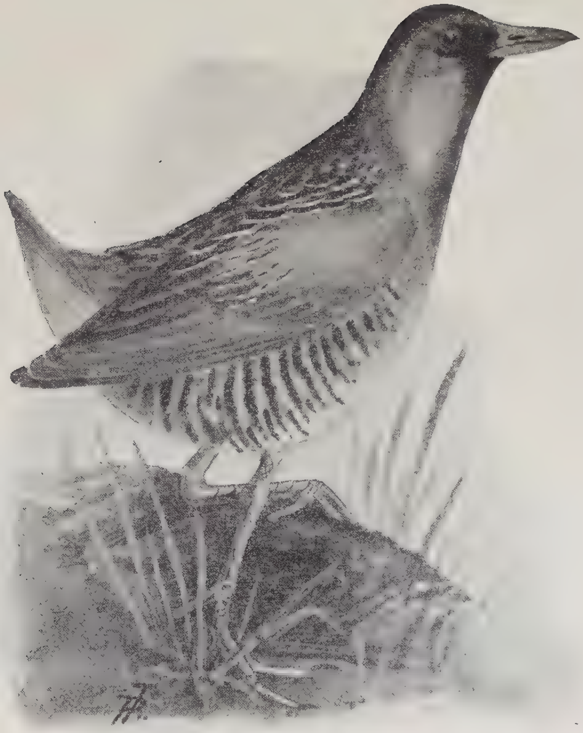

Plate VIII. Sora Rail.
From drawing by P. A. Taverner. (Original.)

82. Yellow Rail. Coturnicops noveboracensis (*Gmel.*). (215)

Synonyms: Little Yellow Rail, Yellow Crake.—Fulica noveboracensis, Gmel., 1789.—Ortygometra noveboracensis, Steph., 1824.—Rallus noveboracensis, Bonap., Aud., Nutt.—Porzana noveboracensis, Cassin, 1858, and most subsequent writers.

Figure 43.

The small size, general yellowness, and sharp white cross-bars on the feathers of the back are distinguishing marks.

Distribution.—Chiefly eastern North America, north to Nova Scotia, Hudson Bay, etc., less commonly west to Nevada and California. No extra limital records except for Cuba and Bermuda.

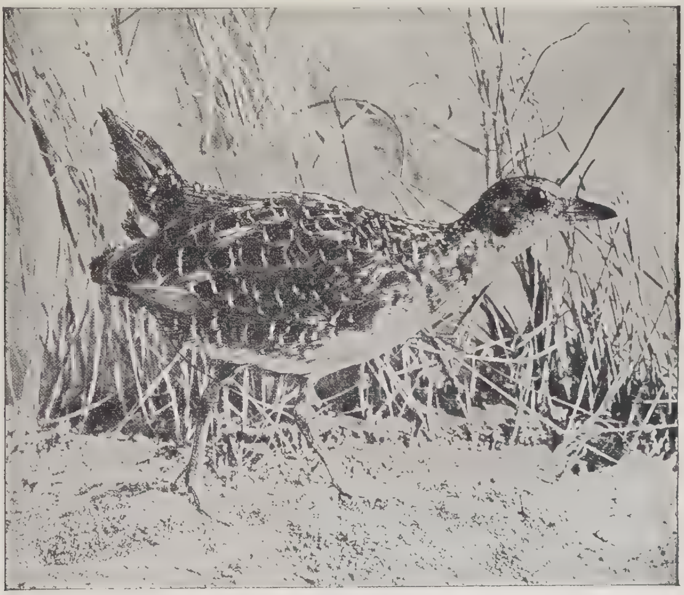

Fig. 43. Yellow Rail.
From Bird Lore. (Courtesy of Frank M. Chapman.)

This little rail is one of the rarest of the family in Michigan and specimens are far from common in our museums. Mr. A. B. Covert states that nine specimens were shot at Ann Arbor, Sept. 13, 1877 by one hunter, a single specimen now preserved in the University Museum being the only one saved. One or two were taken in muskrat traps at Vicksburg, Michigan, by D. Corwin of that place; one was taken near Kalamazoo City, October 19, 1890, and is now in the University of Michigan collection at Ann Arbor (Gibbs, Oologist, Nov. 1890); another specimen was picked up mutilated and too much decomposed for preservation, in the center of Kalamazoo City, about the middle of September, 1900. This specimen was doubtless killed by flying against the telephone wires (Dr. M. Gibbs, The Bittern, Grand Rapids, 1901, p. 4). Dr. Gibbs also records another specimen taken in autumn (date not specified) near Kalamazoo, by Wm. O'Byrne

(Bull. Mich. Orn. Club, II, 1898, 7); and there is a mounted specimen in the Barron collection at Niles, which was examined by the writer in November, 1905. This specimen has no label, but undoubtedly was taken in the vicinity.

There are two specimens in the Museum of Hope College, Holland, Ottawa Co., taken by Mr. Arthur G. Baumgartel in that immediate vicinity, April 21 and 28, 1896. Mr. Baumgartel also states, in a letter dated September 13, 1907, that a third specimen was killed but was lost in the mud. Still another Yellow Rail was taken alive, but injured, on the university campus at Ann Arbor, Sept. 30, 1908, and was mounted for the museum by Norman A. Wood. One other record is that of a female caught by a dog, Mar. 25, 1908, just north of the city limits of Detroit, and now in the collection of P. A. Taverner (Auk, XXV, 1908, 327).

Jerome Trombley, Petersburg, Mich., has a set of four eggs, which in size and coloration meet perfectly the requirements for this species, and which were taken May 29, 1894, in the township of Ida, Monroe county, Mich. Mr. Trombley did not take the eggs himself, but his collector described the bird which was flushed from the nest, and his description tallied well with that of the Yellow Rail. The situation was in a large cranberry marsh, and the nest was fastened to the tops of the long marshgrass, the bottom resting on, or just reaching the water. It was composed entirely of marsh grass. Mr. Trombley says "From the size and appearance of both the bird and eggs the evidence is fairly conclusive, although it is not absolutely certain that the bird was a Yellow Rail."

This species has been taken somewhat frequently in Ontario, Ohio, Indiana, Illinois and Wisconsin. In Wisconsin, according to Kumlien and Hollister, "This little Rail is not nearly so rare as generally supposed, though by no means common. We have authentic records for Racine, Milwaukee, Elm Grove, Delavan, Janesville, Milton, etc., and even breeding records as far north as Brown county (Birds of Wisconsin, 1903, p. 39). Butler says "Those who have met with the Yellow Rail agree that it is the dryer marshes, or wet prairies or meadows, that it prefers; the more decidedly marshy ground is frequented by the larger rails" (Birds of Indiana, 1897, 678). According to Ridgway, the "eggs are six or more, creamy-buff, densely sprinkled and speckled on the larger end with rusty brown. They average 1.12 by .83 inches."

The species, though widely distributed over the United States, appears not to be common anywhere. It is even more difficult to find and to flush than the Virginia Rail, and specimens are rarely found without the aid of a good dog. Few people have studied the bird enough to recognize its note when heard, and so it is not likely to be detected except by systematic and prolonged search in favorable localities. Of course one may be found accidentally, but this is most likely to happen in the case of some sportsman who does not appreciate the importance of the find and makes no record of it.

TECHNICAL DESCRIPTION.

Adult: Head, neck and breast brownish yellow, unmarked; ground color of upper parts the same, but heavily streaked with black and crossed with numerous narrow bars of white; flanks brownish black, barred with white; secondaries white; under tail-coverts light brown. Sexes alike. Length 6 to 7.75 inches; wing 3 to 3.60; culmen .50 to .60; tarsus .95 to 1.00.

83. Purple Gallinule. Ionornis martinicus (*Linn.*). (218)

Synonyms: Sultana (Jamaica).—Fulica martinica, Linn., 1766.—Gallinula martinica, Lath., Aud., Nutt., Baird.—Gallinula porphyrio, Wils., 1824.—Porphyrio americanus, Swains., 1837.—Ionornis martinica, Reich., 1853, Ridgw., 1881, Coues, 1882.

The light blue wings, dark blue head, neck, and breast, green-tipped red bill, and yellow legs, form a combination which makes the adult unmistakable. The young might be confused with those of the Common Gallinule.

Distribution.—South Atlantic and Gulf States, casually northward to Maine, New York, Wisconsin, etc.; south through the West Indies, Mexico, Central America, and northern South America to Brazil.

There are but three or four records for this species in Michigan, so far as we know, and none is entirely satisfactory. Stockwell says "Accidental visitor in Michigan" (Forest & Stream, VIII, 361); Covert has a marginal note in his copy of Coues Key to the effect that a male was taken at Ann Arbor, August 12, 1879, but he does not remember any of the particulars of this capture, and the specimen cannot be located; Mr. B. H. Swales, of Detroit, writes under date of December 15, 1906 "There is a record that Dr. J. H. Garner of Lucknow, Ont., saw a Purple Gallinule at St. Clair Flats about ten years ago (about 1883) that was killed by some boys and examined by him but not preserved" (Biol. Rev. of Ont., Jan. 1894, p. 11). Campion (of Detroit) also says that he has mounted one specimen of the Purple Gallinule "from the Flats."

There are several records for Ontario, the most recent being that by A. B. Klugh, who states that one was taken in Wellington Co., Ontario, near Guelph, about 1894 (Ont. Nat. Sci. Bull. I, 3).

In view of the abundance of the Florida or Common Gallinule, and the further fact that that bird is hardly known at all to the average sportsman, it seems likely that the newspaper reports and occasional notes in sporting magazines refer to the Common Gallinule rather than to the present species, especially as the Common Gallinule in full plumage always shows more or less purple gloss which would tend to deceive the amateur. The bird is abundant in Florida and the Gulf States where it associates with the Common Gallinule and seems to have much the same habits.

TECHNICAL DESCRIPTION.

"Adult: Head, neck, and lower parts slaty bluish purple, darker on the belly and thighs; lower tail-coverts white; upper parts bright olive-green, changing to bright verditer blue toward the purple of the lower parts; wings brighter green than black, shaded with bright verditer blue; frontal shield dusky or bluish; bill bright red, tipped with yellow. Young: Above light brown, tinged with greenish on wings; beneath pale fulvous or buffy, the belly whitish; bill dull yellowish, and frontal shield much smaller than in adult.

Length 12.50 to 14.00 inches; wing 7.00 to 7.50; culmen (including frontal shield) 1.85 to 1.95; tarsus 2.25 to 2.50; middle toe 2.25 to 2.35." (Ridgway).

84. Florida Gallinule. Gallinula galeata (*Licht.*). (219)

Synonyms: Gallinule, Common Gallinule, Water Hen, Mud Hen (St. Clair Flats and Detroit River), Red-billed Mud Hen.—Crex galeata, Licht., 1818.—Gallinula galeata of authors generally.—Gallinula chloropus, Bonap., 1828, Aud., 1835.

Figures 44 and 45.

Readily known by the general slate color, with the white under tail-coverts and a few white stripes along the sides. The red bill and the green legs, changing to bright red close to the body, separate it at once from the Coot, which is also called Mud-hen, but which has a white bill and green legs without any red near the body.

Distribution.—Temperate and Tropical America, from Canada to Brazil and Chili.

The Gallinule, under the name of Mud-hen, is commonly confounded with the Coot, which is equally or more abundant in Michigan. The Gallinule occurs in suitable places throughout the entire Lower Peninsula, but seems to be most abundant in its southern half. It is plentiful in the Monroe county marshes, along the Detroit River, St. Clair Flats, about Saginaw Bay near the mouth of the river, as well as at Chandler's Marsh, Ingham county, and elsewhere in the interior of the state. Its notes, flight, and general appearance are so similar to those of the Coot that considerable care is needed to discriminate between them, and many of the the records of "Mud-hens" probably really refer to this species.

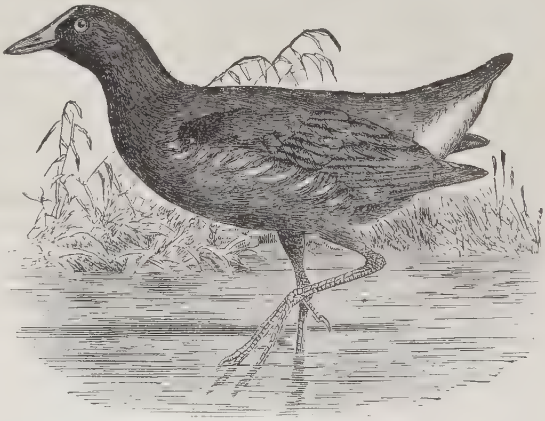

Fig. 44. Florida Gallinule.
From Baird, Brewer and Ridgway's Water Birds of North America. (Little, Brown & Co.)

It nests wherever found, and in some localities is extraordinarily abundant during the nesting season. The nest is commonly placed among the cat-tails or reeds, in standing water, or on small islands in very wet marshes, and the eggs are laid from the first of June to the middle of July. These vary in number from eight to fifteen, and are buffy-white to clear buff, spotted rather scantily with dark brown. They average 1.74 by 1.19 inches.

This is one of our most graceful water birds, a fact which no one would suspect from examination of the distorted specimens usually seen on museum shelves.

The food consists largely of insects, most of which are aquatic, but it also includes many other forms, and Prof. Aughey examined a gallinule killed at Beatrice, Nebr. in September 1872, which had eaten seven grasshoppers, 29 other insects, and some seeds and other vegetable matter.

TECHNICAL DESCRIPTION.

Adult: Head and neck all around dark slaty blue, almost black; breast and belly similar but paler; upper parts, including wings and tail, similar, but brownish on inner secondaries and rump; several conspicuous white streaks on the flanks; most of the under tail-coverts pure white; only the central coverts clear black. Tip of bill yellow, remainder, including the frontal plate, bright red; legs and feet greenish, the half inch next the feathers orange. Sexes alike. Immature: Similar, but under parts gray or nearly white; frontal plate much smaller, and no red on bill or legs. Length 12 to 14.50 inches; wing 6.85 to 7.25; tip of bill to back edge of frontal shield 1.70 to 1.85; tarsus 2.10 to 2.30.

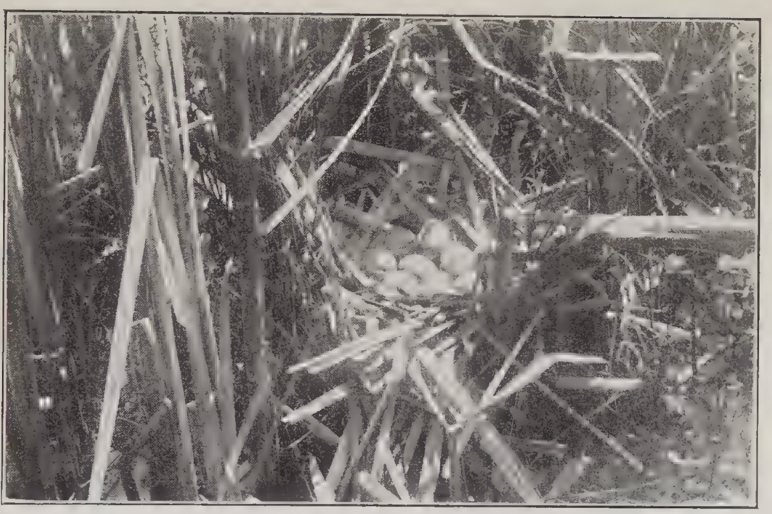

Fig. 45. Nest of Florida Gallinule.
From photograph by Thomas L. Hankinson.

85. Coot. Fulica americana *Gmel.* (221)

Synonyms: Mud Hen, White-billed Mud Hen, Crow Duck, Blue Peter. —Fulica atra, Wils., 1825.—Fulica americana, Gmel., 1789, and of authors generally.

Figure 46.

The scalloped membrane or web along the sides of the toes is distinctive, but even when swimming the bird may be known from the Gallinule, its nearest relative, by the milk-white bill and the white patch, apparently across the wing-tip, formed by the white tips of the secondaries.

Distribution.—North America, from Greenland and Alaska southward to the West Indies and Veragua.

An abundant bird during the migrations, on all the waters of the state, and breeding in all but the southern counties, possibly in all. According to Swales (Bull. Mich. Orn. Club, I, 31) it nests abundantly on Grassy Island in the Detroit River, just below Detroit. It also nests in numbers at St. Clair Flats, according to the same authority. Dr. Gibbs states that he has never found it nesting in Kalamazoo county, although the Gallinule nests there commonly. Cole and Hankinson found it nesting abundantly on Chandler's Marsh, Ingham county, and it nests commonly in all suitable places northward to Lake Superior.

While it resembles the Gallinule much in all its habits, it frequents more open water than that bird, swimming most of the time, and apparently not attempting to run rapidly through the weeds and coarse vegetation, preferring to spend most of its time where it can swim. It is quicker to take wing, flies better and farther, and has a characteristic way of "pattering" over the water when taking wing, apparently trying to run on the surface while flapping vigorously, the wings themselves beating the water at first. While swimming it has a peculiar pecking motion of the head and neck, a sort of exaggerated form of the bobbing of a hen in walking. The nest is a heap of vegetable rubbish, sometimes placed well up among the reeds and deeply hollowed, sometimes but little raised above the surface of the water, occasionally almost floating like that of the Grebe. Langille found the floating type of nest invariably about Dickinson Island, St. Clair Flats. The eggs, from eight to sixteen or even more, are creamy or grayish white, thickly and rather evenly speckled with black, brown, and gray, averaging 1.91 by 1.32 inches. They are distinguishable at a glance from the much more buffy eggs of the Gallinule.

During the migrations, and especially in the fall, the Coots collect in large flocks, sometimes of hundreds, and mingle more or less with various ducks. They are much less shy than ducks as a rule, and as they seldom or never dive, and rise apparently with much difficulty from the water, they are readily killed even by the most inexperienced gunner. The flesh is palatable, but not of the first quality. Coots are rather omnivorous, eating grain, seeds, bulbs, snails, insects, tadpoles, and almost anything animal or vegetable which is available. In one case they were observed to tear off the feathers from a freshly killed duck and eat away a considerable portion of the breast (Taylor, Nidiologist, II, 56).

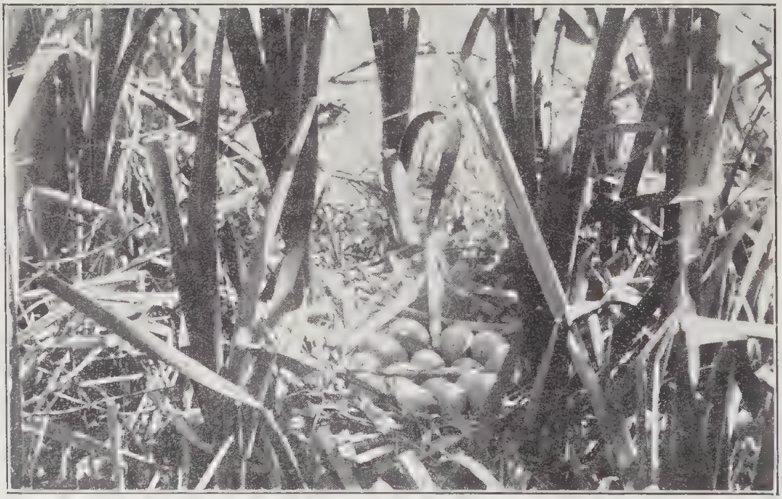

Fig. 46. Nest and Eggs of Coot.
From photograph by Thomas L. Hankinson.

TECHNICAL DESCRIPTION.

Adult: Color in general precisely like that of the Florida Gallinule, but secondaries broadly tipped with white, and no white streaks on the flanks; the head and neck are often nearly black, and the slate color of the back and breast is purer and with very little brown gloss. Bill milky-white; frontal shield brown; iris red; legs yellowish-green to greenish-slate. Sexes alike. Young similar to adult, but frontal shield very small or lacking, and under parts largely white. Length 13 to 16 inches; wing 7.25 to 7.60; culmen, to end of frontal shield, nearly 2; tarsus 2 to 2.20.

Order IX. LIMICOLÆ. Shore Birds.

Family 24. PHALAROPODIDÆ. Phalaropes.

KEY TO SPECIES.

A. Front toes with marginal webs, but the membrane not scalloped (Fig. 47); bill longer than head, very slender. Wilson's Phalarope. No. 88.

AA. Front toes with lobed or scalloped webs. B, BB.

  B. Bill about as long as head, very slender, cylindrical. Northern Phalarope. No. 87.

  BB. Bill about as long as head, rather stout, flattened. Red Phalarope. No. 86.

86. Red Phalarope. Phalaropus fulicarius (*Linn.*). (222)

Synonyms: Gray Phalarope, Sea-snipe.—Tringa fulicaria, Linn., 1766.—Phalaropu fulicarius, Bonap., Nutt., Aud., Baird.—Crymophilus fulicarius, A. O. U. Check-list 1895, and most subsequent authors.

The snipe-like form, but rather short, stout bill and scalloped web bordering the toes, serve to identify this species in any plumage.

Distribution.—Northern parts of Northern Hemisphere, breeding in the Arctic regions and migrating south in winter; in the United States south to the middle states, Ohio Valley, and Cape St. Lucas; chiefly maritime.

When migrating this is a bird of the open water, usually the sea, where it feeds and rests in flocks, swimming as gracefully and safely as a duck, and found along the shore only when driven in by storms. In Michigan it is one of the rarest of the waders and has been noted only a few times. It is credited to Michigan by Stockwell (Forest & Stream, VIII, 22, 361). According to McIlwraith Dr. Garnier saw a flock of six at Mitchell's Bay, near St. Clair, in the fall of 1880 and secured one of them (Birds of Ontario, 1894, 125). One was taken October 24, 1888, on Lake Erie at the mouth of the River Raisin, Monroe, Mich., and recorded by Mr. Robt. B. Lawrence (Auk, VII, 1890, 204). A second specimen taken at Monroe, October 15, 1894, by Mr. Lawrence, was kindly presented to the Michigan Agricultural College; it settled among the duck decoys of the Monroe Marsh Club and was alone when shot. Kumlien & Hollister state that "Small flocks may be met on Lake Michigan and Lake Superior in autumn, and occasionally straggling individuals wander to the larger inland lakes. Four specimens, one adult female and three young of the year, were taken on Lake Koshkonong September 3, 1891. We have but a single state record for the early part of the season, a solitary female killed by Thure Kumlien on Lake Koshkonong June 4, 1877" (Birds of Wisconsin, 1903, 41).

This species nests in Arctic regions, laying three or four pale brown, heavily spotted eggs in a moss-lined hollow on the ground. The eggs average 1.24 by .86 inches. Eifrig found this a very common species about Fullerton and Southampton, in Northwestern Hudson Bay, laying the eggs, without nesting material, in depressions of the sand or moss, often in lichens, about the fresh water ponds (Auk, XXII, 238).

TECHNICAL DESCRIPTION.

Bill sandpiper-like, about as long as the head, flattened and somewhat widened near the end, the tip acute; legs slender and snipe-like, but toes margined with lobed flaps. Adult, during fall migration: Entire under parts, with most of head and neck, pure white; top of head, nape, back of neck, and ring around eye, slaty black; rest of upper parts clear pearl-gray; the primaries and tertiaries black or slaty-black; wing with a conspicuous white wing-bar, formed by the tips of the greater coverts. Immature, at same season: Similar, except that a few blackish feathers may be scattered over the back, and the tertiaries are margined with white or rusty. Length 7.50 to 8.75 inches; wing 5.25 to 5.50; culmen .80 to .95; tarsus .80 to .85. Adults in summer have the entire lower parts deep purplish cinnamon, and the forepart of the head as well as the top dark slate-color; it is doubtful, however, if specimens in this plumage ever occur in Michigan.

87. Northern Phalarope. Lobipes lobatus (*Linn.*). (223)

Synonyms: Red-necked Phalarope.—Tringa lobata, Linn., 1758.—T. hyperborea, Linn., 1766.—Phalaropus hyperboreus, Nutt., Aud., Cass., Baird.—Phalaropus lobatus, Ridgw., 1887, A. O. U. Check-list, 1895, and most subsequent authors.

Known by its similarity to the preceding (including of course the peculiarly fringed toes), but rather smaller, and the bill very slender, cylindrical and sharp, although about the same length.

Distribution.—Northern portions of Northern Hemisphere, breeding in Arctic latitudes; south in winter to the tropics.

This is another marine species which is hardly more than a straggler in Michigan. Dr. Gibbs states that D. D. Hughes, in his manuscript Ornithology of Michigan, says that there is "A specimen in Mr. Barron's collection at Niles; also one in the Hobson collection at Detroit, and said to be not rare on Detroit River in spring." We have not been able to verify any of these statements, and the only phalarope in the Barron collection in November 1905 proved to be Wilson's. Covert in his manuscript list, 1894-95, says there are but two authentic records of its capture; probably referring to the ones just cited. McIlwraith quotes Saunders' record of "One found dead at Mitchell's Bay 1882" (Birds of Ont., 1894, 127). A skin in the Kent Scientific Museum at Grand Rapids proves to have been collected in Freeborn Co., Minn., August 29, 1878. I do not know of an actual Michigan specimen preserved anywhere. Kumlien and Hollister state that this species is "Much more common than the Red Phalarope. * * * Noted on Lakes Michigan and Superior in September and October, and a regular spring and fall migrant on Lake Koshkonong, though more often taken in fall than in spring" (Birds of Wisconsin, 1903, p. 41).

In its habits the Northern Phalarope is quite similar to the Red Phalarope, migrating in flocks, usually over the ocean, at a distance from land. It feeds on small crustacea and other marine animals found at the surface, and it swims and dives with the greatest ease.

It nests far north, laying its eggs in a hollow on the ground, and they closely resemble those of the other phalaropes, being pale olive-buff, thickly spotted with dark brown, and averaging 1.20 by .82 inches.

TECHNICAL DESCRIPTION.

Bill very slender and almost cylindrical, hardly longer than the head; legs and feet very slender, the toes partly webbed, the edges of the webs and the sides of the toes being scalloped or lobed Adult, during migration: Under parts entirely white, as also the forehead, line over the eye, and the sides of the neck; top of head gray, more or less streaked with dusky; a blackish spot in front of the eye and more or less dusky and gray behind and below the eye; upper parts gray or bluish gray. Young, during fall migration: Similar, but more streaked above, the feathers of back mostly margined with buffy, the middle wing-coverts bordered with white or yellowish white. Length 7 to 8 inches; wing 4 to 4.45; culmen .80 to .90; tarsus .75 to .80. In summer the sides of the neck and a considerable part of the upper breast are reddish brown, more conspicuous in the female than in the male; if is doubtful, however, if this species is ever seen in this plumage in Michigan.

88. Wilson's Phalarope. Steganopus tricolor *Vieill.* (224)

Synonyms: Summer Phalarope.—Phalaropus lobatus, Wils., 1825.—Phalaropus Wilsoni, Sab., 1823, Nutt., Aud., Cass., Baird.—Steganopus Wilsoni, Coues, Ridgw.—Steganopus tricolor, Vieill., 1819.—Phalaropus tricolor, A. O. U. Check-list, 1895.

Figure 47.

The combination of a snipe-like form and action, with the thick elastic plumage of a duck and the web-margined toes, is common to the three species of phalarope, but the present species is distinguished easily by its superior size, the absence of lobes in the toe webs, and especially by the slender bill from an inch to an inch and a quarter long.

Distribution.—Temperate North America, chiefly the interior, breeding from northern Illinois and Utah northward to the Saskatchewan region; south in winter to Brazil and Patagonia.

This bird, both in structure and habits, is more snipe-like or sandpiper-like than either of the others. Confined almost entirely to fresh water lakes and marshes it is less often seen swimming on the open lake, more often found wading in the marshy pools or swimming there in small flocks.

According to Nelson "The charming grace of movement exhibited at such times, combined with their tasteful elegance of attire, form one of the most pleasing sights one could witness, as they swim buoyantly from side to side of the pool, gracefully nodding their heads; now pausing an instant to arrange a feather or to daintily gather some fragment of food, and now floating idly about, wafted by the slight breeze which at intervals ripples the surface of the water. A more common, but scarcely less pleasing sight is presented when, unconscious of observation, they walk sedately along the border of the water, never departing from their usual easy grace of movement" (Bull. Nutt. Club, II, 41).

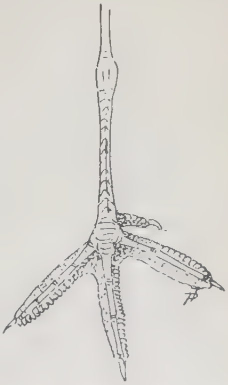
Fig. 47. Wilson's Phalarope. (Original.)

The same writer states that the male commonly prepares the nest and attends to the whole duty of incubation, but the female remains in the vicinity and evidently helps care for the young, although the females disappear about the middle of July, before the males and young. The nest is said to be a shallow depression in the soft earth, which is usually lined with a thin layer of fragments of old grass blades, upon which the eggs, numbering from three to four, are deposited about the last of May or first of June. Owing to the low situations in which the nests are placed the first set of eggs is often destroyed by a heavy fall of rain, causing the water to rise so as to submerge the nest. In this case the second set, numbering two or three, are often deposited in a depression scratched in the ground, as at first, but with no sign of any lining. Accidents of this kind cause the second set of eggs to be deposited sometimes as late as the last of June (Nelson). These notes relate to northeastern Illinois, where in suitable places the species is actually abundant, not exceeded in numbers, says Mr. Nelson, by even the ever-present Spotted Sandpiper.

Wilson's Phalarope is far from common in Michigan. Dr. Gibbs and two companions shot five in Kalamazoo county from a flock of fifteen or twenty, May 21, 1878, and Dr. Gibbs states that another man shot a single specimen September 8 of the same year. There is a specimen in the collection of C. J. Davis, Lansing, taken at Chandler's Marsh, Ingham county, probably about 1892 or 1893, and T. L. Hankinson took a pair at Chandler's Marsh June 21, 1897, and was sure they were breeding. Mr. Saunders records one killed at Mitchell's Bay, St. Clair Flats in May 1882 (McIlwraith, Birds of Ont., 1894, 128); and J. Claire Wood (letter, July 28, 1905) says "In June, 1900, my brother saw one specimen at St. Clair Flats, and Jesse Craven saw a pair there under circumstances that convinced him they were breeding." May 9, 1906 Mr. J. Claire Wood saw a pair of these phalaropes in Ecorse township, Wayne County, and on May 12, Mr. P A. Taverner took a female in full plumage near the same place (Auk, XXIII, 1906, 335). Mr. A. B. Covert records the taking of a male and female on the Huron River, near Ann Arbor, April 19, 1887 (Marginal note Coues Key). The same collector has also recorded a nest with both parent birds secured at Portage Lake, 26 miles north of Ann Arbor, July 2, 1875 (Forest & Stream, VI, 25, 402). Mr. Stewart E. White says it is uncommon at Grand Rapids (MS. List 1885). It is also included in Kneeland's List of the Birds of Keweenaw Point, 1859, a doubtful record.

The above records indicate that although the species is widely distributed in Michigan it is nowhere common. The eggs are described as cream buff or grayish buff, heavily spotted with dark brown or black; they average 1.28 by .90 inches.

The food of all the phalaropes seems to consist entirely of animal forms, and mainly of minute mollusca, crustacea, and aquatic insects. The present species, however, does not confine itself to aquatic forms, but eats a great variety of insects, including many terrestrial species.

TECHNICAL DESCRIPTION.

Bill decidedly longer than the head, very slender, almost cylindrical; legs slender, toes slightly webbed at base, with a narrow marginal web along each toe, but without scallops or lobes. Adult female in summer: Entire top of head bluish-gray, whitening on the nape and hind neck and becoming darker blue-gray on the middle of the back; a black stripe through the eye, expanding into a large black patch on the side of the neck and continued as a broad chestnut stripe along the side of the neck to the middle of the back; chin and upper throat white, as also the breast and the belly; the middle of the throat more or less washed with rufous and pale chestnut; sides and flanks grayish; rump and upper tail-coverts white, sometimes buffy tinted; wings brownish gray, the outer primaries with white shafts; tail-feathers largely white, broadly margined with gray. The adult male in summer is smaller and much less conspicuous, lacking almost entirely the strongly contrasted pearl-gray, chestnut, and black, and being simply grayish above and white below. In any plumage, however, the bird is recognizable by the details of bill and feet. Length of female 9.40 to 10 inches; wing 5.20 to 5.30; culmen 1.30 to 1.35; tarsus 1.30 to 1.35. Length of adult male 8.25 to 9 inches; wing 4.75 to 4.80; culmen 1.25; tarsus 1.20 to 1.25.

Family 25. RECURVIROSTRIDÆ. Stilts and Avocets.

KEY TO SPECIES.

A. Front toe fully webbed, hind toe present. Avocet. No. 89.
AA. Front toes slightly webbed, no hind toe. Stilt. No. 90.

89. Avocet. Recurvirostra americana *Gmel.* (225)

Synonyms: American Avocet.—Recurvirostra occidentalis, Vig., 1829.—Recurvirostras americana of most authors.

Recognized at once by the sharp, slender, snipe-like bill turned up toward the tip very decidedly. It can be mistaken for no other bird, except possibly for the Black-necked Stilt, but the latter species has the bill slightly or not at all turned upward, and has the back of the neck clear black while the Avocet has the neck cinnamon or white.

Distribution.—Temperate North America, north to the Saskatchewan and Great Slave Lake; in winter south to Guatemala and the West Indies. Rare in the eastern United States.

One of our very rare waders, and apparently much less common now than formerly. "W. H. Collins records one specimen taken at St. Clair Flats in 1874, and preserved in the collection of the Audubon Club, in the Museum of the Detroit Scientific Association" (Gibbs, American Field, Nov. 10, 1894). Mr. B. H. Swales writes me from Detroit (May 28, 1906) "There is an Avocet at Campion's which Collins mounted, and it may be the same bird that he is understood to have taken at the Flats. Campion tells me that when he came here he secured a lot of Collins' birds and that there was a list with data, but this was destroyed." According to Moseley there is, or was, a specimen in the Kent Scientific Institute at Grand Rapids, and Dr. R. H. Wolcott writes that the specimen was collected in that immediate vicinity. In November, 1905, I found a mounted specimen of the Avocet in the Kent Scientific Museum, bearing the catalogue number 20220, but with absolutely no data from which its origin could be traced.

There are several records for Toronto, Ont., a number for Wisconsin (Kumlien and Hollister p. 42), and it has been taken in Indiana, Ohio, and Illinois (Butler's Birds of Indiana, 1897, p. 695). It is not known to nest in Michigan, and occurs probably only during the northward migration in May and the southward migration is September and October. It is an abundant species about the alkaline lakes of the Great Basin region of the west, and occurs frequently of late years in the irrigated regions of Arizona and southern California. It may nest anywhere in the United States. The nest is placed on the ground; the eggs are three or four, pale olive or buffy olive, thickly spotted with brown and black, and averaging 1.93 by 1.35 inches.

In habits the Avocet much resembles the Yellow-legs, frequenting sand bars, mud flats and the shallow margins of lakes and streams, where it feeds like a sandpiper on the minute animal life of the shores, or wades about in the water gleaning aquatic insects, crustaceans and other forms from the bottom. Professor Aughey found many locusts in the stomachs of two taken in Sarpy county, Nebraska, in September 1874, and one taken in Richardson county, Nebraska in September 1873, had 71 insects of various kinds in its stomach (1st Rep. U. S. Entom. Com. App. 2 p. 50).

TECHNICAL DESCRIPTION.

A hind toe present, but very small; the three front toes fully webbed. Rump, upper tail-coverts, and entire under parts pure white, as are also the middle of the back, the outer scapulars, about half the secondaries, and the terminal half of the greater wing-coverts; the rest of the wings, the inner scapulars, and a stripe on each side of back, brownish-black; tail ashy. In summer the adult has most of the head and the entire neck and upper breast pale cinnamon; in winter these parts are pure white, or bluish or grayish-white. Young birds resemble winter adults, but the primaries are tipped with whitish, the back more or less mottled with brownish or buff, and the back of neck washed with rusty. Length 15.50 to 18.75 inches; wing 8.50 to 9; culmen 3.40 to 3.65; tarsus 3.70 to 3.80 (Ridgway).

90. Stilt. Himantopus mexicanus (*Mull.*). (226)

Synonyms: Black-necked Stilt, Lawyer.—Charadrius mexicanus Müll., 1776.—Himantopus nigricollis, Vieill., Nutt., Aud., Baird.—Recurvirostra himantopus, Wilson, 1813.

Known at once by the extremely long legs, pure white under parts and black back, the back of the neck also clear black.

Distribution.—Temperate North America, from the Northern United States southward to the West Indies, northward to Brazil and Peru. Rare in the eastern United States except in Florida.

An extremely rare bird in Michigan; and I know of no Michigan specimen in any collection. It is included in Stockwell's list of Michigan birds (Forest & Stream, VIII, 22, 361), but no specific instance of its occurrence is given. Covert (marginal notes in Coues Key) records a specimen from Sand Shore Lake, Ann Arbor, October 14, 1880; and D. D. Hughes (MS. Orn. of Mich.) says that "a Mr. Metcalf, of Grand Rapids, Kent county, secured a specimen near there, and has seen others on two occasions" (Gibbs).

While looking over specimens in the store of F. R. Vigeant at Sault Ste. Marie, July 10, 1903, Mr. Vigeant told me that he killed a pair of Black-necked Stilts on the shore near St. Ignace, on the Straits of Mackinac, "several years ago," and that he afterwards sold them, mounted to a gentleman in Ohio, whose address he gave me. A letter to that address was returned unclaimed, and I was unable to trace the specimens. In Wisconsin, according to Kumlien and Hollister, "this species is a very rare straggler, the only record being that of Dr. Hoy, who states that he met a small flock near Racine in April, 1847. The single specimen preserved in his collection was probably taken at this time" (Birds of Wisconsin, p. 42). In Ohio, according to Lynds Jones (Birds of Ohio, 1903, 65) there are some old records by Dr. Wheaton and Dr. Langdon, but nothing since 1879. Butler, in his Birds of Indiana, 1897, does not mention the species at all.

The Stilt is a bird of the west and south, where it is not uncommon, being particularly abundant about the alkaline lakes and pools of the Great Basin, where it is often seen in company with the Avocet. It breeds, at least occasionally, in the Gulf States and Mexico, and the eggs are olive or drab, spotted and blotched with very dark brown, and averaging 1.79 by 1.23 inches.

TECHNICAL DESCRIPTION.

No hind toe; a small web between outer and middle toes only. Plumage clear black (or slaty black in female) and pure white, in large, sharply defined areas. Adult male: Top of head, back of neck, back, scapulars and wings, continuous deep black, sometimes with a greenish cast; forehead, rump, upper tail-coverts, and entire under parts from chin to tail, pure white; tail ashy; iris red; legs and feet rose-color or crimson. Female:

Similar, but the glossy black replaced by dull black or brownish slate. Young: Like adult female, but all the dark areas more or less mottled by grey or buffy edgings of feathers.
Length 13.50 to 15.50 inches; wing 8.50 to 9; culmen 2.50; tarsus 4.

Family 26. SCOLOPACIDÆ. Snipe, Sandpipers, Etc.

KEY TO SPECIES.

A. Bill (culmen) two inches or over. B. BB.
  B. Wing less than six inches. C, CC.
    C. Three outer primaries much narrower than rest (Fig. 49); tibia feathered to heel joint ("knee"). Woodcock. No. 91.

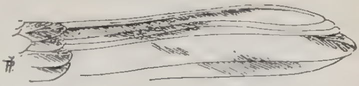

Fig. 49.

    CC. Outer primaries not narrow; lower end of tibia bare. D, DD.
      D. Tail with a rust-red bar near end; rump and upper tail-coverts without white. Wilson's Snipe. No. 92.
      DD. Tail without a rust-red bar; rump and upper tail-coverts largely white. Red-breasted Snipe. No. 93.
  BB. Wing more than seven inches. E, EE.
    E. Bill straight or with slight upward curve. F, FF.
      F. Bill more than 2.75 inches. G, GG.
        G. Bill 3.50 inches or more. Marbled Godwit. No. 103.
        GG. Bill less than 3.50 inches. Hudsonian Godwit. No. 104.
      FF. Bill less than 2.75 inches. H, HH.
        H. Basal half of primaries white, forming a large white patch on the wing. Willet. (Appendix)
        HH. No white patch on wing. Greater Yellowlegs. No 105.
    EE. Bill curved decidedly downward. I, II.
      I. Crown with a median light stripe between two broad dusky ones. Hudsonian Curlew. No. 112.
      II. Crown without median light stripe. J. JJ.
        J. Bill (culmen) 2.50 inches, or less. Eskimo Curlew. No. 113.
        JJ. Bill from 3 to 8.50 inches. Sickle-billed Curlew. No. 111.
AA. Bill (culmen) less than 2 inches long. K, KK.
  K. Wing more than 6 inches. L, LL, LLL.
    L. Rump without any white. Bartramian Sandpiper. No. 108.
    LL. Rump pure white without bars or streaks. Lesser Yellowlegs. No. 106.
    LLL. Rump white, barred with dusky. Knot. No. 95.
  KK. Wing less than 6 inches. M, MM.
    M. Bill more than an inch long. N, NN.
      N. Tarsus more than 1.50. O, OO.
        O. Wing 5 inches or over. Stilt Sandpiper. No. 94.
        OO. Wing less than 5 inches. Red-backed Sandpiper. No. 100.

NN. Tarsus less than 1.50. P, PP.
  P. Tail with cross-bars. Solitary Sandpiper. No. 107.
  PP. Tail without cross-bars. Q, QQ.
    Q. Bill straight. R, RR.
      R. Upper parts purplish-black without rusty. Purple Sandpiper. (Appendix)
      RR. Upper parts mottled with black, whitish and rusty. Grass Snipe. No. 96.
    QQ. Bill curved downward toward tip. Curlew Sandpiper. (Appendix)
MM. Bill one inch or less. S, SS.
  S. Only three toes, hind toe lacking. Sanderling. No. 102.
  SS. Hind toe present. T, TT.
    T. Wing over 4 inches. U, UU.
      U. Upper tail-coverts white. White-rumped Sandpiper. No. 97.
      UU. Upper tail-coverts not white. V, VV.
        V. Wing more than 5 inches, inner webs of primaries speckled with blackish. Buff-breasted Sandpiper. No. 109.
        VV. Wing less than 5 inches. W, WW.
          W. Outer tail-feathers with spots or bars. Spotted Sandpiper. No. 110.
          WW. Outer tail feathers without spots or bars. Baird's Sandpiper. No. 98.
    TT. Wing 4 inches or less. X, XX.
      X. No webs between the toes. Least Sandpiper. No. 99.
      XX. Distinct (but small) webs between the toes. Semipalmated Sandpiper (and possibly Western Sandpiper). No. 101.

91. Woodcock. Philohela minor (*Gmel.*). (228)

Synonyms: Wood Snipe, Bog-sucker, Timber-doodle.—Scolopax minor, Gmel., 1788, Wils., 1812, Aud., 1835.—Philohela minor of most authors.

Plate IX, Figures 48, 49, 50.

Distinguishing marks are the long, grooved bill, short legs feathered to the heel ("knee"), very large eyes, and top of head barred with buff and black. The scythe-shaped or falcate tips of the three outer primaries are distinctive.

Distribution. -Eastern North America, north to the British Provinces, west to Dakota, Kansas, etc.; breeding throughout its range.

This beautiful bird, justly celebrated for its table qualities, was formerly an abundant resident of the entire state, being fairly plentiful in all suitable localities, which of course are wooded or brushy swamps, since this species is practically confined to wet woodlands and the thickets bordering streams. In autumn it is occasionally found in cornfields and often about the edges of fairly dry woods, but usually where the ground is soft enough for probing with the whole length of the bill. This method of feeding is almost unique, for the long bill is forced into the ground up to the feathers in search of

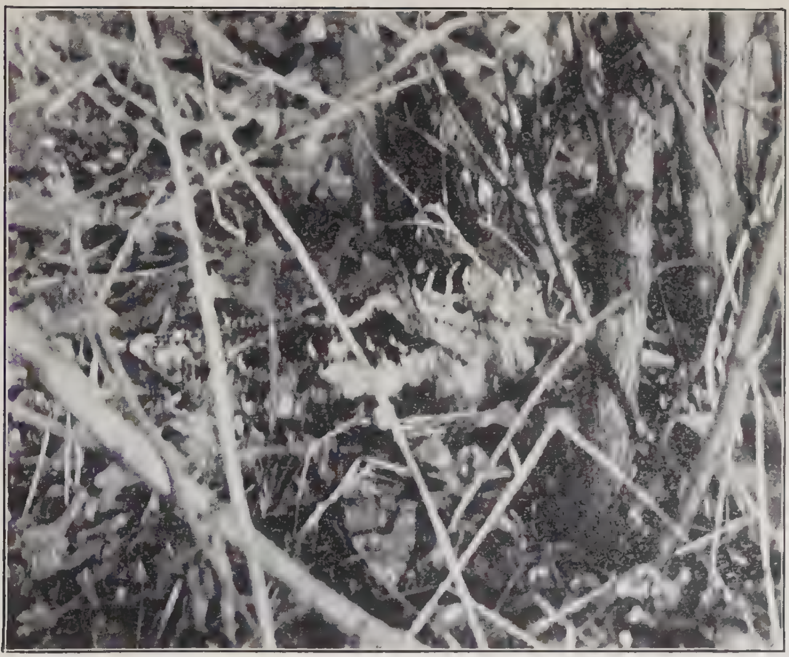

Plate IX. Woodcock on Nest.

From photograph by Hegner. (Courtesy of G. Alan Abbott.)

worms and possibly other animal food and its structure is such that the mandibles may be separated near the tip without withdrawing the bill. The holes thus left in the soft ground, and known to the sportsman as "borings," are infallible indications of the neighborhood of the bird, but since it feeds mainly by night and hides closely by day, a good dog is absolutely necessary for successful shooting.

There is no reason to suppose that the Woodcock gets all its food by probing or "boring"; in fact there is abundant evidence to the contrary. The structure of the bill allows the bird to pick up food from the surface with ease and precision, and the examination of stomachs proves that the diet is quite varied. Although earthworms are consumed in large numbers, various other worms are also eaten, and soft-bodied insect larvæ, especially those of subterranean habits, are constantly devoured. Dr. B. H. Warren, of West Chester., Pa. records beetles, larvæ, and a single spider, as taken from stomachs, and one killed in November, had eaten nothing but small seeds (Birds of Pa., 1888, p. 80). Professor Aughey found locusts in several Woodcock taken in Nebraska, and although other insects usually formed the larger part of the food, one taken in Otoe county in September 1876, had 32 locusts in its stomach, "besides a large number of other insects" (1st Rep. U. S. Entom. Com. App. 2, p. 51).

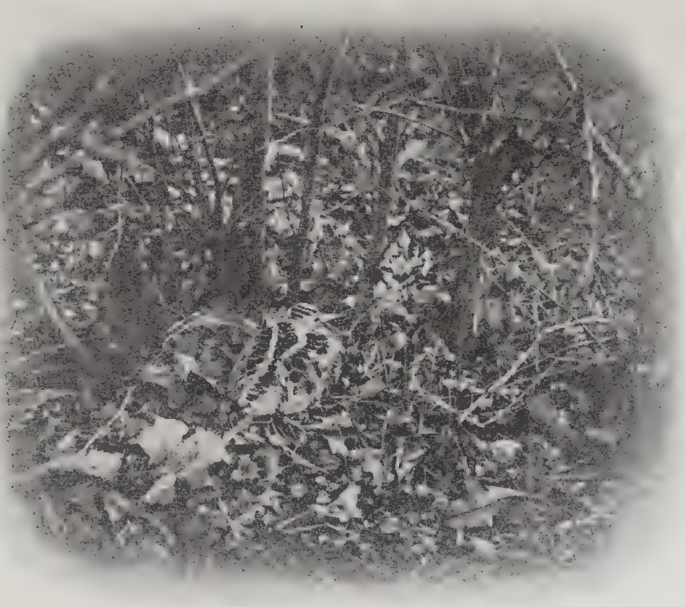

Fig. 48. Woodcock on Nest.

Photograph from life. (Courtesy of Gerard Alan Abbott.)

It has an interesting habit of "towering," that is, of rising to a considerable height by spiral flight, at either morning or evening twilight, uttering a peculiar series of notes meanwhile, and then pitching back to the earth again with great velocity and alighting close to the point from which it started.

The Woodcock has decreased in numbers very seriously within the past twenty years, and for a time was believed to be on the verge of extinction. Even at the present time it seems to be entirely absent from large sections of country where it was formerly abundant, and although believed to be again increasing in numbers it is nowhere so common as formerly.

It arrives from the south almost as soon as the ground is free from snow, very frequently before the last snow storm of winter. Probably in the southern counties a few always arrive before the middle of March, and the greater part of the local birds by April first. Since the Woodcock nests freely in the northernmost parts of the state, however, and since these regions are often covered with ice and snow until the last of April, or even the first of May, many migrants may be found in the southern half of the state all through April. The southward movement begins in early September and continues through October, but after the middle of the latter month very few are found.

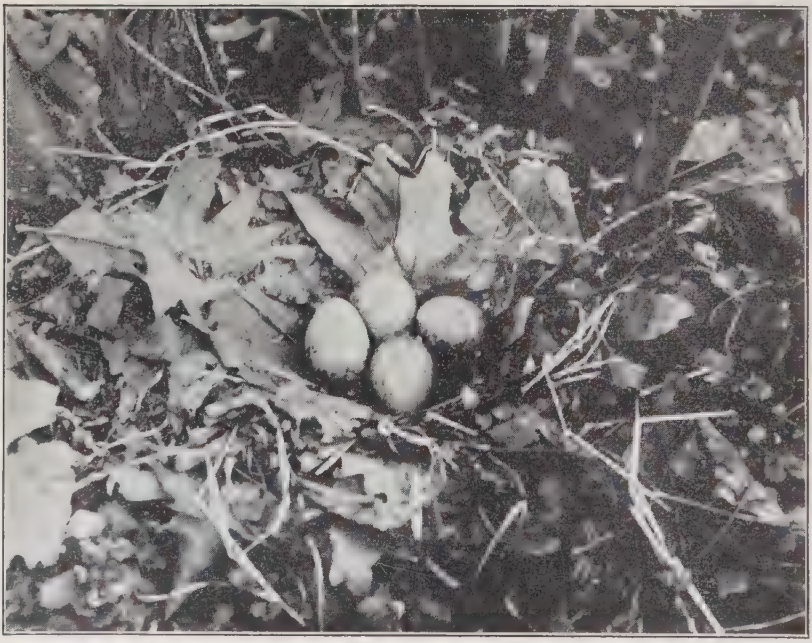

Fig. 50. Nest and Eggs of Woodcock.

From photograph. (Courtesy of Gerard Alan Abbott.)

In Southern Michigan the first eggs are almost always laid in April. The nest is simply a hollow among the dry leaves, and the eggs commonly four in number, beautifully spotted and mottled with various shades of brown, and averaging 1.51 by 1.14 inches. Nests with eggs are found from the first week in April until well into May, but these later sets are probably second layings, the first having been destroyed by bad weather or by some of the numerous enemies which beset ground-nesting birds. Miss Harriet H. Wright, of Saginaw, states that she examined two nests in that vicinity, May 14, 1906, one of which contained three young, and the other four eggs. The female is a very close sitter, seldom leaving the nest until almost trodden on, and occasionally she will allow herself to be lifted from the nest by the hand, sometimes even scrambling back as soon as released.

The extent to which Woodcock sometimes suffer from bad weather during migration is well shown by an account given by Arthur T. Wayne of a cold wave and gale on the coast of South Carolina between December 27, 1892 and January 2, 1893. He states that at Mt. Pleasant, S. C. 2,000 Woodcock were killed on one day and 10,000 in six days, between the above dates (Auk, X, 204).

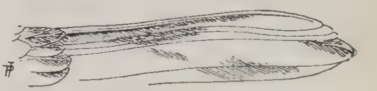
Fig. 49. Woodcock's wing-tip. (Original.)

TECHNICAL DESCRIPTION.

Forehead and crown ashy gray, with an indistinct median black stripe; occiput and nape clear black, with three or four narrow cross-bars of deep buff or rufous; entire back, scapulars and rump black, mottled and barred with rufous, but many feathers broadly edged or tipped with clear bluish-gray; side of head ashy to buffy-white, with a black line from base of bill to eye; a similar black stripe across the ear-coverts; chin white; sides of neck brownish ash; throat, breast and belly buffy or pale cinnamon, deepening on the sides and flanks; breast and throat indistinctly barred with rufous; primaries slate-colored; secondaries and most of wing-coverts barred with black and buff; tail-feathers mainly clear black, the tips abruptly ashy above, silvery white below. Sexes alike. Length 10.50 to 11.75 inches; wing 4.80 to 5.70; culmen 2.50 to 3; tarsus 1.25.

92. Wilson's Snipe. Gallinago delicata (*Ord*). (230)

Synonyms: Common Snipe, Jack-snipe, American Snipe, Bog-snipe, English Snipe, Snipe.—Scolopax Wilsoni, Temm., Nutt., Aud., and others.—Gallinago wilsoni, Bonap., Cass., Baird, Coues.—Scolopax drummondi, Sw. and Rich.

Figures 51, 52.

The distinctive marks are the long slender bill, about 2½ inches, the comparatively short legs, the upper parts striped with brown and tan, and the under parts more or less streaked, spotted and barred.

Distribution.—North and middle America, breeding from the northern United States northward; south in winter to the West Indies and northern South America.

This is another sportsman's bird, but, unlike the Woodcock, it is found mainly in the open marshes, never in woods or even in thickets along streams. Like the Woodcock, however, it is rarely or never seen upon the ground, being invisible until flushed, when it rises with a sharp call or "scaipe" and flies away with great rapidity and often in a zigzag course. When first flushed it is likely to keep near the grass, but after flying a hundred yards or less it is apt to rise to a considerable height, circling about for several minutes and finally pitching downward and alighting not far from its starting point. It is never found in flocks, for although a dozen may be found in the compass of an acre they usually rise singly, circle independently, and alight separately.

It is most abundant spring and fall, arrives from the south as soon as the frost is out of the bogs, and returns again from the north in September, lingering until November. Snipe shooting is notoriously uncertain, bogs which are alive with them one day being almost deserted the next, and marshes which afford good shooting one season being almost worthless the next year.

Although the larger number pass farther north to breed, a few always remain in middle Michigan for this purpose, and probably there are few counties, even in the southern part of the state, in which Wilson's Snipe does not nest occasionally. We have single records of nesting from Jackson county (Watkins), Washtenaw county (Purdy, Covert); several records from Kalamazoo county (Gibbs, Syke), and the vicinity of Lansing (J. E. Nichols, W. B. Barrows). We have an egg in the Agricultural College collection taken near Lansing by a friend of Mr. Jason E. Nichols, whose dog, while hunting Snipe late in the spring, flushed a female from her nest and broke all but one of the four eggs. During some summers Wilson's Snipe are fairly common on Chandler's Marsh, Ingham county, during June and July, and unquestionably nest there in some numbers. In other years not an individual is to be found there between June first and the middle of August.

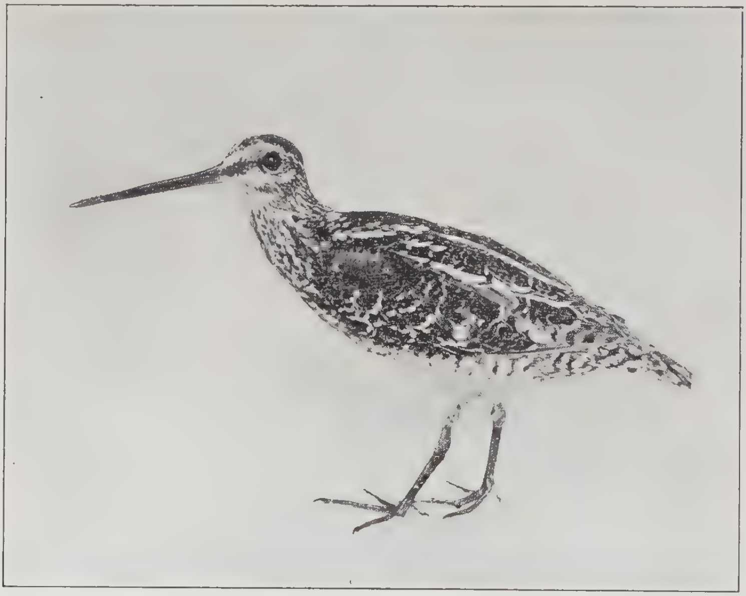

Fig. 51. Wilson's Snipe.
Photograph from mounted specimen. (Original.)

During the late spring (undoubtedly while mating) the bird has a habit of "bleating," which consists of rising to a considerable height and then pitching downward obliquely toward the ground with great rapidity, making a peculiar sound with the wings, and probably also at the same time with the voice. The same individual will repeat this action half a dozen times in succession, and often several birds may be within hearing at the same time. The male alone is supposed to indulge in this pastime, but I am not aware that this is anything better than an inference.

The food is obtained largely by probing in the wet ground in the manner of the Woodcock, but apparently this species prefers wetter ground than the Woodcock, at all events the holes or "borings" are seldom visible, even in places where Snipe are breeding regularly. But the bird also eats large numbers of insects and other invertebrates for which it does not probe. In eleven stomachs of this species examined by Professor Aughey of Nebraska, there were found 678 insects, 412 of which were locusts (1st Rep. U. S. Entom. Com., App. 2, p. 51).

Neither of the common names, English Snipe nor Jack Snipe, is strictly correct. The first is a complete misnomer, since our species is distinctly American; the other is applied with equal frequency to the Pectoral Sandpiper or Grass Snipe, which it slightly resembles.

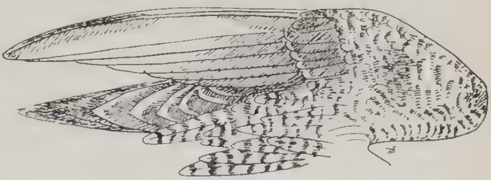

Fig. 52. Wing of Wilson's Snipe. Seen from below, showing barred axillaries. (Original.)

The nest is invariably placed on the ground, in wet places, and consists merely of a hollow among the herbage, only slightly lined with grasses and leaves. The eggs, usually four, are olive gray or olive brown, heavily spotted with deep brown and purplish gray and average 1.55 by 1.09 inches.

TECHNICAL DESCRIPTION.

Top of head black, with a median stripe of buffy white, and a similar one from nostril over eye to nape; a dusky bar from bill to eye; chin white and unspotted in spring, buffy brown, more or less streaked, in autumn; neck all around, and upper breast, buffy brown, streaked with dark brown or black; upper parts brownish black or black, the scapulars and interscapulars edged with creamy white in spring, rufous in autumn, most of the back speckled or barred with rufous or buff; lower breast and belly white; sides and axillars narrowly barred with black and white; tail barred with black and rufous, tips of feathers often white. Sexes alike and seasonal changes not great, though the autumn dress is much redder or browner. Length 10 to 12 inches; wing 4.90 to 5.60; culmen 2.50 to 2.70.

93. Red-breasted Snipe. Macrorhamphus griseus griseus (*Gmel.*). (231)

Synonyms: Dowitcher (Deutscher), Brown-back, Grey Snipe, Gray-back.—Scolopax grisea, Gmel.,—Scolopax noveboracensis, Wils., Aud., and others.

Known by its general resemblance to Wilson's Snipe, but the lower back and rump white, mostly unspotted, and the under parts mainly cinnamon or buffy brown.

Distribution.—Eastern North America, breeding far north; south in winter to the West Indies and Brazil.

This is a bird of the shore, not of the bog; moreover it is usually found in flocks, running about in plain sight on the open mud or sand, in all which it is entirely unlike Wilson's Snipe.

This does not seem to be a common species in Michigan. Dr. Gibbs saw a small flock in Kalamazoo county, May 21, 1888; Major Boies says it is occasionally seen in Hillsdale and Lenawee counties, and that he observed a few in the spring on the shores of the west side of Neebish Island (1892-1894). One was killed by J. Claire Wood on a mud flat bordering the River Rouge, Wayne county, October 7, 1890, when a small number were seen (Swales, MS. List, 1904). One was taken by the writer at Chandler's Marsh, Ingham county, August 26, 1897 and a second specimen at East Lansing, August 14, 1908.

These two skins were sent to the U. S. National Museum and the identification confirmed by Dr. C. W. Richmond. Mr. P. A. Taverner has two specimens in his collection taken in Wayne county, one on August 26, 1905, and the other, July 14, 1906. The former was doubtfully referred by Ridgway to the western form, *M. scolopaceus*, but the latter was identified as true *griseus*. More recently both specimens have been examined by other experts, and compared with better specimens, and it seems probable that both belong to the eastern subspecies, *griseus*.

This subspecies so closely resembles the western form (Western Red-breasted Snipe), that it is impossible to separate the two except with specimens in hand. Michigan seems to be on the dividing line, since both subspecies have been taken near Chicago, although the present form is more common (Woodruff, Auk, XIII, 180). In Wisconsin, according to Kumlien and Hollister, the eastern form was formerly a common migrant, but is now exceedingly rare. There are in the Milwaukee Public Museum two specimens from Lake Koshkonong, taken in August 1886 (Birds of Wisconsin, 1903, 43).*

The eggs are four, laid in a hollow in moss or grass, usually without any lining. They are greenish olive to gray, spotted rather coarsely with umber brown, and average 1.65 by 1.13 inches.

TECHNICAL DESCRIPTION.

Top of head, scapulars, interscapulars and upper surface of wings, brownish black or black, more or less streaked or margined with buffy-brown; back of neck ashy brown, dimly streaked; middle of back pure white, unspotted; rump white, with rounded black spots; upper tail-coverts and tail evenly and narrowly barred with black and white, about ten black bars on each tail-feather; chin and belly buffy or soiled whitish; rest of under parts washed or tinted with brownish buff, obscurely streaked with dusky on the sides and under tail-coverts; axillars barred black and white, the bars chevron-shaped, primaries black, the outer one with a white shaft. Length 10 to 11; wing 5.25 to 5.90; culmen 2 to 2.55 inches.

94. Stilt Sandpiper. Micropalama himantopus (*Bonap.*). (233)

Synonyms: Long-legged Sandpiper, Frost-snipe. Tringa himantopus, Bonap., 1826, Nutt., 1834.—Micropalama himantopus, Cass., 1858, Baird, Coues, Ridgw., A. O. U. Check-list, 1895.

The long, slightly recurved bill, somewhat widened toward the tip, and the unusually long shanks (tarsi) are peculiar to this species and will identify it in any plumage.

Distribution.—Eastern North America, breeding north of United States, and migrating in winter to Bermuda, West Indies and Central and South America.

Occurs only as a migrant in Michigan, and that not commonly. Probably a few pass through the state every season, but they are rarely detected. According to Dr. Gibbs "D. D. Hughes in his MS. Ornithology of Mich., says that Sid Van Horn shot and mounted a fine young specimen taken at a pond in Calhoun county." The species is mentioned in Miles' list, 1860, but is omitted by Sager, Cabot, Boies and Trombley. Covert states that it is a rare migrant in all parts of the state, more being killed during August than at any other time. Three specimens were taken at Ann Arbor, May 4, 1877, and a specimen taken in August 1892 is preserved in the University of Michigan museum (MS. list 1894-95). There are two mounted specimens in the Kent Scientific Museum at Grand Rapids, under the single catalogue number 20313. According to the record one of them is from Grand Rapids, the other from Toronto, Ont., and both collected by Thos. Harmer. According to E. W. Nelson (Bull. Nutt. Orn. Club, II, 68) it is a migrant along Lake Michigan in Cook and Lake counties, Ill. It has been taken in Indiana and Ohio, and was formerly not uncommon in Wisconsin, although now very irregular (Kumlien and Hollister, Birds of Wisconsin, 1903, page 44).

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*For further notes on the Western Red-breasted Snipe see Appendix.

It nests within the Arctic Circle, and the four eggs are said to be "pale grayish buff, or grayish buffy white, boldly spotted with vandyke brown and purplish gray, and average 1.42 by 1.00 inches." (Ridgway).

TECHNICAL DESCRIPTION.

Hind toe present, bill longer than head, about equal to tarsus, the latter always more than one and one-half inches long, and less than one and three-quarters inches. Adult in summer: Back and scapulars mostly black, mixed with some gray and buff; upper tail-coverts white, with dusky bars and streaks; top of head streaked with dusky and pure white; ear-coverts and sides of occiput light rust-red; a dark streak from corner of mouth to eye; rest of head and neck whitish, streaked with dusky; under parts grayish-white, barred with dusky. Adult in winter: Upper parts uniform ash or gray, the tail-coverts white, more or less streaked and barred; upper breast, sides of neck, and lower tail-coverts streaked with gray; rest of lower parts white, as is also a streak over the eye. Young: Similar, but browner and buffier, the rump white, unspotted, the under parts washed with buff, sometimes streaked with dusky. Length 7.50 to 9.25 inches; wing 5 to 5.30; culmen 1.55 to 1.75; tarsus 1.55 to 1.70.

95. Knot. Tringa canutus *Linn.* (234).

Synonyms: Robin Snipe, Red-breasted Sandpiper, Red-breast, Beach Robin, Gray-back.—Tringa canutus, Linn., 1758, Cass., Baird, Coues, A. O. U. Check-list, 1895.—Tringa cinerea, Brunn., Gmel., Wils., Nutt.—Tringa islandica, Aud., 1838.

Adults may be known by the cinnamon or brick-red under parts, which give them the names Robin Snipe and Beach Robin (Carolinas); immature birds are gray above and nearly white below, but the size and proportions are distinctive. Largest of our beach sandpipers.

Distribution.—Nearly cosmopolitan. Breeds in high northern latitudes, but visits the southern hemisphere during its migrations.

One of the rare beach birds now, but much more common formerly. It is one of those species which was extraordinarily abundant on the Atlantic coast thirty years ago but which has decreased to such an extent at present as to be considered one of the less common migrants. We have few positive records for Michigan. Covert states that one was picked up dead on the Shore of Dead Lake, Washtenaw county, in October, 1876 (Birds of Washtenaw county, 1878); and J. Claire Wood reports one killed near Port Austin, Huron county, September 4, 1899 (Auk, XVII, 391). We recently examined a specimen, apparently a "yearling" which was taken at Benton Harbor, Berrien county, June 23, 1904, by Russell Hawkins, of Grand Rapids, and is now in his collection. He states that there were about twenty in the flock, and that he killed two, one of which spoiled before he could prepare the skin. The date is unusually late, but the bird was in immature dress and probably the entire flock was composed of non-breeding birds. Another specimen of the Knot was found in the Kent Scientific Museum (No. 20215), said to have been collected by Thomas Harmer, but without other data. We have two well mounted specimens in the Agricultural College Museum, taken by Albert Hirzel, at Forestville, Sanilac county, June 20, 1903; Norman A. Wood saw two and secured one on Charity Island, Saginaw Bay, September 1, 1910, and A. G. Ruthven took three at Oak Point, south shore of Saginaw Bay, August 20-21, 1908 (Rep. Mich. Geol. and Biol. Surv., Pub. 4, Biol. Ser. 2, 1910, p. 280).

The Knot is mentioned in Steere's list of 1880, and also in Stockwell's list (Forest and Stream, VII, 22, 361). It is omitted from the lists of Sager, Cabot, Miles, Hughes, Trombley, and Boies. E. W. Nelson states that it formerly occurred in migration along the shore of Lake Michigan in northeastern Illinois (Bull. Nutt. Club, II, 1877, p. 68). In Wisconsin it is said to have been a common migrant thirty years ago, in May and June, and more sparingly in autumn; of late years decidedly rare at any season (Birds of Wisconsin, 1903, p. 45). It has been taken also occasionally in Ontario and Ohio, but is never common.

In habits it is a typical sandpiper, preferring the sandy beach to all other localities. though it often visits the salt marsh, and the shores of ponds and creeks at a little distance inland. It is always a sociable species and formerly was invariably seen in flocks, sometimes of large size. These flew with great rapidity, usually following the outline of the beach only a few yards from shore and often directly over the breakers. In feeding the Knot runs swiftly along the beach, following the receding waves to pick up the minute animals left stranded, and avoiding the returning waves with great agility and skill.

It nests in the far north—within the Arctic Circle. Only a single egg is known, and that was taken near Ft. Conger, in latitude 81° 44′ north, by Lieut. A. W. Greely. It is light pea-green, closely spotted with brown in small specks about the size of a pin head (Auk, II, 1885, 313).

TECHNICAL DESCRIPTION.

Wing more than six inches long; bill rather longer than head. Adult in summer: Light gray above, more or less mottled with blackish and tinged with rusty; rump and upper tail-coverts white, with numerous narrow blackish bars; under parts uniform light reddish or cinnamon, palest on the belly; flanks and under tail-coverts often barred or streaked with gray; a whitish stripe over the eye, often tinged with cinnamon. Adult in winter: Similar, but upper parts plain gray, with few darker markings, except the rump and upper tail-coverts, which are as in summer; under parts white or grayish white, the neck, breast and sides barred or streaked with dusky, and with little or no trace of the cinnamon. Young similar to winter adult, but scapulars and back feathers edged with pure white, with a sub-edging of black; the top of head and back of neck narrowly striped with dusky. Length 10 to 11 inches; wing 6.50; culmen 1.30 to 1.40; tarsus about 1 25.

96. Grass Snipe. Pisobia maculata (*Vieill.*). (239)

Synonyms: Pectoral Sandpiper, Jack Snipe, Grass-bird, Meadow-snipe.—Tringa maculata, Vieill., 1819, Cass., Baird., A. O. U. Check-list, 1895.—Actodromas maculata, Coues, 1861, Ridgw., 1881.—Tringa pectoralis, Say, Nutt., Aud.

Figure 53.

Known by its moderate size, gray-brown back, black rump and upper tail-coverts, thickly streaked chest and throat, white chin and belly, and bill not over $1\frac{1}{4}$ inches.

Distribution.—The whole of North America, the West Indies, and the greater part of South America. Breeds in the Arctic regions. Of frequent occurrence in Europe.

This is the bird most often called Jack Snipe, a name also given to Wilson's Snipe. The present species, though often known under the name of Grass Snipe, is not entirely confined to grassy places, but frequents the margins of muddy pools and is occasionally found on the sandy shores of ponds and streams. It is an abundant migrant throughout the state, and is one of the best known of the shore birds which occur regularly. Ordinarily it is seen in squads of six to thirty, around grassy pools in marshes or meadow lands.

On August 19, 1897, near Lansing, the writer saw at least 300 Grass Snipe about a temporary pool in a cornfield, associated with Yellowlegs, Killdeer, Solitary Sandpipers, and a few Wilson's Snipe. It seems to be more abundant always in fall than in spring, but occasionally it appears in some numbers in May. When scattered about in grassy meadows it often lies close and flushes almost as suddenly as Wilson's Snipe, and in the fall of the year it is considered good eating.

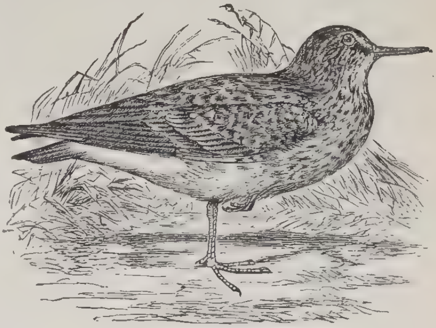

Fig. 53. Grass Snipe.
From Baird, Brewer and Ridgway's Water Birds of North America. (Little, Brown & Co.)

There is no reason to suppose that it ever nests within our limits. It passes northward usually before the first of June, and nests only in the far north, where it lays three or four grayish buff or olive green eggs, heavily blotched with vandyke brown and purplish gray, which average 1.44 by 1.02 inches.

TECHNICAL DESCRIPTION.

Top of head, back and scapulars mainly black and brown, each feather mostly black with a wide margin of brown or buff; neck all around, and most of throat and upper breast, ashy-gray, thickly and rather sharply streaked with black; chin, upper throat, and abdomen white or buffy white; sides (under wings) somewhat streaked with brown; axillars white, unmarked; rump and upper tail-coverts black or brownish black.

Autumn specimens are browner, spring specimens grayer; little or no sexual difference in color, but females larger than males. Length 8 to 9.50 inches; wing 5 to 5.50; culmen 1.10 to 1.20.

97. White-rumped Sandpiper. Pisobia fuscicollis (*Vieill.*). (240)

Synonyms: Bonaparte's Sandpiper.—Trianga fuscicollis, Vieill., 1819, Coues, 1874, A. O. U. Check-list, 1895.—Tringa bonapartei., Schleg., Cass., Baird.—Tringa Schinzii, Bonap., Nutt., Aud.

Characterized by its moderate size (wing about five inches), and white upper tail-coverts, unspotted or with very few spots indeed.

Distribution.—Eastern North America, breeding in the high north. In winter, the West Indies, Central and South America, south to the Falkland Islands. Occasional in Europe.

This is one of our less common sandpipers, yet it doubtless occurs regularly during migrations, although in small numbers. Dr. Gibbs states that specimens were killed in Kalamazoo county during 1878 and 1879, by B.

F. Syke and others; he also states that it has been taken at Petoskey. Jas. B. Purdy states that at Plymouth, Mich., he has seen it but two or three times, and then as a migrant. B. H. Swales (MS. List of Birds of S. E. Mich., 1904) says "I have no records. It is not rare around Lake Erie in Monroe county, according to Trombley." On July 29, 1897, the writer took a specimen at Chandler's Marsh, north of the Agricultural College, but it was so badly mutilated and so fat that it was not preserved; subsequently (Aug. 18, 1897) several specimens were seen at a pool within the city limits of Lansing. Mr. P. A. Taverner of Detroit, found six specimens at a little mudhole in Ecorse township, Wayne county, on June 2, 1906, and took three of them (Auk, XXIII, 1906, 335).

In its general habits it resembles closely the Grass Snipe, or Pectoral Sandpiper, with which it often associates.

About the southern end of Lake Michigan it was formerly more abundant than at present. Nelson says: "Rather uncommon migrant (in northern Illinois). June 9, 1876 I obtained one specimen and saw quite a number of others upon the lake shore near Waukegan. Mr. R. P. Clark informs me that he has taken it late in autumn upon the lake shore near Chicago" (Bull. Essex Inst. Vol. VIII, 1876, p. 127). It has also been taken in Ohio, Ontario, and Wisconsin, but seems to be nowhere abundant.

It nests in Arctic regions in June and July, laying four eggs in a mere hollow in the ground, with scarcely any lining. The eggs are reddish drab, spotted with dark brown and black, and average 1.37 by .94 inches.

TECHNICAL DESCRIPTION.

Upper parts buff or brownish-gray, mottled and streaked with black, much as in the preceding species, but the rump dusky and the upper tail-coverts pure white, or with a few arrow-marks of dusky; chin and upper throat white; lower neck and breast, as well as sides, spotted and streaked with dusky. In autumn the plumage shows more rusty coloration, especially above, and immature (young of the year) birds often have white or buff tips on the scapulars and interscapulars. Length 6.75 to 8 inches; wing 4.90 to 5; culmen .90 to 1.

98. Baird's Sandpiper. Pisobia bairdi (*Coues*). (241)

Synonyms: Actodromas bairdii, Coues, 1861, Ridgw., 1881.—Tringa bairdii, A. O. U. Check-list, 1895.

Most closely resembles the White-rumped Sandpiper, with which it was confused for many years, and for which it is often mistaken even now. Baird's Sandpiper has brownish-black instead of white upper tail-coverts, and autumn specimens are lighter below than the White-rumped Sandpiper, and have a buffy tint on the breast, but, except for the white tail-coverts, very careful examination would be needed to discriminate the two species.

Distribution.—Nearly the whole of North and South America, but chiefly the interior of North and the western portions of South America, south to Chili and Patagonia. Breeds in Alasks and on the Barren Grounds. Rare along the Atlantic coast, and not yet recorded from the Pacific coast of the United States.

This bird, which normally inhabits the interior region to the west of Michigan, appears to be not uncommon in the neighborhood of the Great Lakes during the migrations, although for a considerable time it was regarded as one of the rarest of our sandpipers. According to B. H. Swales (MS. List of Birds of S. E. Mich., 1904) the first state record was made by J. C.

Wood, who obtained specimens in August, 1890, near the River Rouge. Mr. Newell A. Eddy of Bay City, took two specimens on Saginaw Bay, Sept. 11, 1891, four more Sept. 1, 1893, and several others Sept. 23, 1893. One of those taken in 1893 was examined, and the identification verified, by Dr. T. S. Palmer, of the Biological Survey, Washington, D. C., and the writer also examined two of Mr. Eddy's specimens in November, 1904. Mr. A. B. Covert took a specimen near Ann Arbor, August 15, 1893; Leon J. Cole took one on the Lake Michigan shore, in Ottawa County, August 20, 1895, and several more were taken at the same place August 24 to 26, 1896, by L. J. Cole, T. L. Hankinson, and W. E. Mulliken. Two of these latter specimens are now in the collection of the Agricultural College, and one (No. 24387) in the Kent Scientific Museum, Grand Rapids. There is another specimen of Baird's Sandpiper in the same collection, which was taken in Charlevoix county, September 6, 1879, and Mr. Leon J. Cole informs us that on the back of the original label was written "T. bonapartii," and if ever reported in any list or otherwise it was as the White-rumped Sandpiper. Mr. R. H. Wolcott states that he found Baird's Sandpiper along the river at Grand Rapids at the end of August, 1897, and F. H. Chapin states that he has seen it in Emmet, Cheboygan and Charlevoix counties in August and September. Five individuals were seen on the Charity Islands, Saginaw Bay, two on August 23 and three on August 24, 1910 (N. A. Wood, Wilson Bulletin, XXIII, No. 2, 1911, 90). J. Claire Wood says it is "common in July and August near Detroit, Wayne county" (Auk, XVII, 390). On the other hand, according to Swales (MS. List of Birds of St. Clair county, 1904), there is no authentic record for St. Clair county.

In its habits it does not seem to differ much from its near relative the White-rumped Sandpiper, and the descriptions of its notes, food, and nesting habits are more or less confused with those of the latter species. It nests far north, and lays four light buff eggs, thickly spotted with brown, averaging 1.30 by .93 inches.

Professor Aughey examined the stomachs of five specimens taken in Nebraska in October, 1873, 1874, and found locusts in three stomachs and numerous other insects in all (1st Rept. U. S. Entom. Com., Appendix II, 52).

TECHNICAL DESCRIPTION.

Wing between 4.50 and 5 inches; median upper tail-coverts brownish black, the lateral coverts much lighter. Ground color of entire upper parts pale grayish brown, often with a buffy tint, always more or less streaked or spotted with dark brown or blackish, the markings darkest and sharpest on top of head and interscapulars, lightest and most diffuse on back of neck; chin and most of under parts pure white or buffy white, the throat and chest alone darker buff and sometimes indistinctly streaked with dark brown or blackish. In winter the adult is less distinctly streaked above, and little or not at all below, while young birds are distinctly streaked with brown or blackish on the chest and throat, and the scapulars, interscapulars, tertiaries and most of the wing coverts are sharply edged or tipped with pure white. Length 7 to 7.60 inches; wing 4.60 to 4.85; culmen .90 to 1; tarsus 1.

99. Least Sandpiper. Pisobia minutilla (*Vieill.*). (242)

Synonyms: Sand-peep, Little Sand-peep, Peep.—Tringa minutilla, Vieill., 1819.—Actodromas minutilla, Bonap., 1856, Ridgw., 1881.—Tringa pusilla, Wils., Sw. and Rich., Aud.—Tringa wilsonii, Nutt., 1834, Baird, 1859.

Recognizable by its small size (wing less than four inches), toes without webs at base, and rump and median upper tail-coverts black.

Distribution.—The whole of North and South America, breeding north of United States. Accidental in Europe.

This is one of the commonest of the sandpipers and occurs regularly in spring and fall in suitable places, both on the lake shores and in the interior, usually in squads of 3 to 10, or more rarely in flocks of 20 to 50. On the Atlantic coast flocks of 200 to 500 are not uncommon in favorite feeding places, but I have never heard of its occurrence in large flocks in Michigan. It passes northward in May and June, the great majority during the former month, but a few remain until after the first of June, sometimes even until the 10th or 15th of the month. It reappears in July, always as early as the 20th, sometimes by the 10th, and is usually abundant through August, while some may remain until October.

While with us it frequents sandy and muddy shores, and particularly the muddy pools in marshes, sloughs, and fields almost anywhere. The temporary ponds formed by the heavy thunder showers of August are commonly well patronized by this species, often accompanied by the Semipalmated Sandpiper and the Grass Snipe, together with several larger species. Usually it is very unsuspicious and especially when in small squads will feed unconcernedly at a distance of four or five yards from the observer. It eats vast numbers of minute aquatic animals, but also feeds largely on insects, including injurious locusts.

We have no reason to believe that it ever nests within our limits, and the argument sometimes advanced, that it could not leave here the first week in June, proceed northward to Arctic regions and rear its young and be back again by the middle of July, is based on an entire misconception of the facts. The great majority of the birds go northward before the first of June, and doubtless those which go north first are the ones which return earliest in July; on the other hand those which linger until the middle of June may not return to us with their young before the last of August, which allows plenty of time for nesting. It is a well known fact, moreover, that not all the individuals of a species nest every season, and it is entirely possible that some of those we see in midsummer are not breeding birds.

Nevertheless Mr. E. W. Nelson found this species nesting along the Calumet River in northeastern Illinois, on the 5th of June, 1875, and another observer found several of them near Waukegan, Illinois, the first of July, 1875, and is certain that they nested in the vicinity (Bull. Essex Inst., VIII, 1876, 127).

Its usual breeding grounds are far north of the United States, where it nests on the ground, laying three or four pale buffy or brownish eggs, thickly spotted with brown and purplish, and averaging 1.15 by .83 inches.

TECHNICAL DESCRIPTION.

Smallest of our sandpipers, about six inches long and not heavier than an English Sparrow. Upper parts mostly black, the feathers edged or streaked with buff or brown; central upper tail-coverts black, unspotted; lateral upper tail-coverts white; chest and part of throat white or grayish white, thickly streaked with brownish black; chin and rest of under parts, including under-tail coverts, pure white. Autumn adults have the chin grayish or spotted and the upper parts more rusty than in spring, while young of the year have an ashy pectoral band, with the dark streaks more or less indistinct or wanting, and many of the scapulars and interscapulars margined with pure white. Length 5 to 6.75 inches; wing 3.50 to 3.75; culmen .75 to .92.

100. Red-backed Sandpiper. Pelidna alpina sakhalina (*Vieill.*). (243a)

Synonyms: Black-bellied Sandpiper, Red-backed Dunlin, American Dunlin, Black-heart Plover (Ontario).—Tringa alpina, Wils., Nutt., Aud.—Tringa alpina var. americana, Baird, 1859, Coues, 1872.—Tringa alpina pacifica, Coues, 1861, A. O. U. Check-list, 1895.

A medium sized sandpiper (wing about 4¾ inches), known in any plumage by the rather long bill (about 1½ inches) bent slightly downward, like a curlew's, for the terminal third.

Distribution.—North America in general, breeding far north. Eastern Asia.

This is one of the scarcely common, but regular, migrants, and apparently pretty evenly distributed throughout the state. It is sometimes seen in small flocks, but more often singly or in squads of 3 to 5, not infrequently in flocks of other species. It was taken by F. L. Washburn at Ann Arbor, May 14, 1888; P. A. Taverner found about a dozen on Sarnia Bay, May 26, 1901; Hubert L. Clark saw one on the shore of Long Lake, Brookfield, May 24, 1904; A. W. Blain, Jr., killed one at St. Clair Flats, November 20, 1904; Newell A. Eddy finds it not uncommon on Saginaw Bay, and took several specimens October 3, 1890, and a male October 5, 1891; Dr. Gibbs records two taken at Austin's Lake, Kalamazoo county, May 25, 1878, by Geo. B. Sudworth, and several seen and one killed at Humphry's Lake, May 31, 1883; Purdy took one specimen at Plymouth in the spring of 1891, and Swales states that it is occasionally reported at St. Clair Flats by J. Claire Wood, and on St. Clair River. Major Boies says that it is frequently seen on the south and east shores of Neebish Island, St. Mary's River, in the fall (Bull. Mich. Orn. Club I, 1897, 20). We have three specimens in the Agricultural College Museum, taken at Forestville, Sanilac county by Albert Hirzel; and Norman A. Wood reports a flock of about twenty at Oak Point, south shore of Saginaw Bay, August 20, 1908 (Rep. Mich. Geol. and Biol. Surv., 1910, Pub. 4, Biol. Ser. 2, p. 291).

W. A. Oldfield recorded the nesting of this bird at Port Sanilac, Sanilac county, where he took a nest, three eggs and parent bird (Cook, Birds of Mich., 2d ed., 59). This record has been questioned, and at first sight seems very improbable, since the species usually nests in Arctic and sub-Arctic regions; but when we remember how many northern waders Nelson and others found nesting in northeastern Illinois, it is scarcely wise to condemn Oldfield's record as untrustworthy. Unfortunately the bird taken with the eggs was never examined by a recognized ornithologist, and both bird and eggs were destroyed by the burning of Mr. Oldfield's house, when he lost his entire collection.

As with most other sandpipers, the eggs are laid on the ground, in an imperfectly lined nest, and are three or four in number, buffy or brownish, spotted with dark brown. They average 1.43 by 1.01 inches.

Formerly this species seems to have been more abundant in the Great Lake region, and as late as May, 1899, according to Kumlien and Hollister "53 individuals were killed by the discharge of a double-barreled shot-gun" (Birds of Wisconsin, 1903, 47). This bird is less suspicious than many of the sandpipers, and being large enough to serve as food is frequently killed in considerable numbers.

TECHNICAL DESCRIPTION.

Wing between 4.25 and 4.75 inches, median upper tail-coverts dark like the back, bill distinctly longer than the head, gently curved downward. Adult in spring and summer.

Top of head, back, scapulars, tertiaries, lesser wing-coverts and median upper tail-coverts, bright reddish-brown or rusty, each feather with a black streak or spot; lower breast and belly with a more or less extensive black patch, sometimes with a few whitish feathers intermixed; chin, breast and sides, pure white or pale grayish-white with a very few narrow black shaft stripes; sides of head, neck all round, and chest clear grayish-white, more or less distinctly streaked with dusky, the breast spots often arrow-shaped. Adult in winter: plain ash-gray above, without streaks or spots except some indistinct dusky shaft stripes; median upper tail-coverts blackish, the lateral ones nearly white; forehead, chin and most of under parts pure white or grayish white, the throat and chest more or less distinctly streaked with darker ash; no trace of the abdominal black patch. Young: Similar to winter adult, but feathers of back more or less margined with rusty or buff and tipped with white.

Length 7.60 to 8.75 inches; wing 4.30 to 4.75; culmen 1.15 to 1.40; tarsus .85 to 1.

101. Semipalmated Sandpiper. Ereunetes pusillus (*Linn.*). (246)

Synonyms: Peep, Sand-peep, Little Peep.—Tringa pusilla, Linn., 1766.—Tringa semipalmata, Wils., Sw. and Rich., Aud.—Ereuntes pusillus of most authors.

Very similar in coloration to the Least Sandpiper and of about the same size (wing less than four inches), though the rump is ashy instead of black; it can always be separated from the Least Sandpiper, however, by the fact that the toes are plainly webbed at base.

Distribution.—Eastern North America, breeding north of the United States; south in winter to the West Indies and South America.

A common bird in migration, appearing and disappearing at about the same times as the Least Sandpiper, with which it is often associated. It frequents the same localities and has in all respects essentially similar habits excepting that the Semipalmated Sandpiper has never been found nesting within the United States.

Butler states that in Indiana it is generally uncommon, but usually more numerous in spring than the Least Sandpiper (Birds of Indiana, 1897, p. 715). In Wisconsin it is quite abundant during migrations, and according to Kumlien and Hollister "so many are summer residents that one usually gets the impression that it nests. Evidence of breeding is however entirely lacking, although specimens shot on Lake Koshkonong June 16, 1897, contained ova the size of medium hazelnuts and were in full breeding plumage." (Birds of Wisconsin 1903, 47). E. W. Nelson also found it in northeastern Illinois where he says that it is "a very abundant migrant and many remain through the summer. From repeated dissections I am confident these are barren birds and, as Mr. Maynard suggests, probably young of the preceding year." (Bull. Essex Inst. VIII, 1876, 126-127).

It nests commonly in Labrador and the Hudson Bay region, laying three or four dull grayish-buff eggs, spotted with dark brown and purplish gray, and averaging 1.21 by .85 inches (Ridgway).

TECHNICAL DESCRIPTION.

Upper parts mottled black and gray, the central upper tail-coverts alone being clear black or brownish black; marginal upper tail-coverts white; lower parts pure white except for a pectoral band of ashy gray, more or less streaked with dusky or black, the streaks most distinct and numerous in summer birds, indistinct or wanting in winter and in young of the year; the latter also show some rusty, buffy or white edgings on the feathers of the back. The bill is about the same length as that of the Least Sandpiper, but much broader in proportion. Length 5.25 to 6.75 inches; wing 3.65 to 4; culmen .68 to .92.

102. Sanderling. Calidris leucophæa (*Pallas*). (248)

Synonyms: Beach Bird, Surf Snipe, White Snipe.—Tringa leucophæa, Pall., 1764.—Tringa arenaria, Linn., 1766.—Calidris arenaria of most authors.

The only Beach Bird of its size with but three toes—the hind toe lacking. It is also probably the palest or whitest of the sandpipers, young birds and adults in the fall being pure white below, and white, speckled thinly with darker, above. In flight the compact flocks, light bodies, dark wings, and conspicuous white wing-bars, are good recognition marks.

Distribution.—Nearly cosmopolitan, breeding in the Arctic and sub-Arctic regions, migrating, in America, south to Chili and Patagonia.

This seems to be a rather common species along the shores of the Great Lakes during migration, but is seldom met with in the interior. Dr. Gibbs states that so far as he knows it has never been taken in Kalamazoo county. Mr. Newell A. Eddy has found it abundant some years on the shores of Saginaw Bay. He took a dozen or more October 3, 1890, and found it abundant again Sept. 26, 1896. Leon J. Cole calls it an abundant fall migrant along the shore of Lake Michigan at Grand Haven, and Major Boies observed it on the east shore of Neebish Island in the spring of 1893. The only record which I have been able to find for any point not on the shore of the Great Lakes is a record of four seen at Ann Arbor, August 26, 1899, by Chas. L. Cass. A very late record is that of a male taken by Hirzel at Forestville, Sanilac county, November 24, 1903, and now in the Agricultural College Museum.

This is a typical beach species and is usually seen feeding at the very edge of the water, following the retreating waves and picking up particles of food, in Michigan mainly insects, left by the water. It rarely visits the upper parts of the beach, and still more rarely, if at all, the grassy or muddy ponds inland. In flight the members of the flock keep close together, yet always preserve about the same distance, and they act practically like a single bird, all rising and falling, turning to right or left, wheeling or alighting with the utmost uniformity and precision. Ordinarily they are one of the least suspicious of the shore birds and may be approached very closely while feeding.

They nest only in the far north and their eggs have been taken only a few times. The nest is placed on the ground and sometimes at a considerable distance from the water, which is surprising in a species which ordinarily loves to have its feet wet all the time. The eggs are three or four, light olive-brown, spotted and speckled with darker, and average 1.41 by .91 inches.

According to Elliot "its food consists of minute mollusca, crustacea, worms, insects, and in the far north it has been observed to eat the buds of saxifrage" (North Am. Shore Birds, 1895, 102, 103).

TECHNICAL DESCRIPTION.

Toes three in front, no trace of a hind toe. Bill about as long as head, slender, straight black. Adult in summer: Upper parts pale rusty with numerous black spots and many feathers tipped with white; under parts mainly white, the throat and breast washed with rusty and finely speckled and lined with blackish; a conspicuous white wing-band formed by tips of greater coverts; basal parts of inner primaries also white, the outer webs and tips of all blackish, the shafts white. Adult in spring: Top of head, occiput, back and scapulars, black, coarsely mottled with grayish white, often some feathers showing rusty edgings; back of neck grayish white, more or less striped with pale brown; entire under parts spotless white, the throat and chest often shaded lightly with pale rust-red. Some late migrants are quite ruddy on the chest, while others show hardly a trace of rusty above or below. Length 7 to 8.75 inches; wing 4.70 to 5; culmen .95 to 1; tarsus .90 to 1.05.

103. Marbled Godwit. Limosa fedoa (*Linn.*). (249)

Synonyms: Great Marbled Godwit, Great Godwit, Red Curlew, Brant Bird, Red Marlin, Brown Marlin, Spike-bill.—Scolopax fedoa, Linn., 1758.—Scolopax marmorata, Lath., 1790.—Limosa fedoa, Ord, Aud., Nutt., and most recent authors.

A snipe-like bird of large size (wing about nine inches), known from its relatives by the long bill (3½ inches or over) which has a distinct upward curve all the way from base to tip. and by the cinnamon color of the lining of the wings.

Distribution.—North America; breeding in the interior (from Iowa and Nebraska, northward to Manitoba and the Saskatchewan), migrating in winter to Guatemala, Yucatan, and Cuba.

This is a rare species in Michigan at the present time, but seems to have been less so formerly. Covert records the capture of a female on Clam Lake, Cadillac, May 3, 1881 (Marginal notes in Coues Key), and Hazelwood states that it is "less common in September on the Michigan shore of Lake Huron near Port Huron" (MS. List, 1904). L. Whitney Watkins has a specimen in his collection, marked "Monroe Flats, 1881," which was obtained from a taxidermist at Manchester, Michigan many years ago. A mounted specimen in the Kent Scientific Museum (No. 20063) is marked "D. D. Hughes, Grand Rapids," but bears no date. It seems to be in autumnal plumage. There is also a nicely mounted adult in the Barron collection at Niles, but without data.

The Marbled Godwit is said to be decidedly rare in Wisconsin, Illinois, and Ohio at present. It was formerly an abundant bird of the prairie regions west of the Mississippi, but of late years seems to be found in numbers only about the alkali lakes and large bodies of shallow water in the far west. According to Kumlien and Hollister (Birds of Wisconsin, 1903, 48) "Mr. H. Nehrling gives it as breeding in the Northern Peninsula of Michigan," but I am not able to verify this statement.

It is said to nest most commonly in Manitoba and the Saskatchewan region, but it also nests in Minnesota, the Dakotas, Nebraska, and other western states. The nest is placed on the ground, and the eggs are pale olive to light grayish buff, rather sparsely spotted with dark brown and dull purplish gray, and average 2.27 by 1.60 inches.

Professor Aughey found it feeding freely on locusts in Nebraska in 1867 and 1874, but says that it never feeds exclusively on them; he found from 30 to 45 other insects in each of the stomachs examined (1st Rep. U. S. Entom. Com. Appendix 2, p. 53).

TECHNICAL DESCRIPTION.

Tail and its upper coverts cinnamon or buff, barred with black or brown; axillars and under wing-coverts also cinnamon. Chin white; rest of underparts buffy white to pale cinnamon, streaked on the throat, and more or less thickly barred on breast and sides with brown or brownish black; entire top of head and back and sides of neck brown, streaked with ashy or buffy white; rest of upper parts brown, the feathers variously spotted, barred, edged or tipped with buffy white or cinnamon; wings mainly brownish black, the outer primaries buffy on the inner webs and with white or buffy shafts; basal half of bill flesh-colored, the remainder brown or black; legs and feet dark slate. Adults are more heavily barred below than the young, which often are entirely without dark markings on breast, sides and belly. Apparently there is little or no difference in the sexes. Length 16.50 to 20.50 inches; wing 8.50 to 9; culmen 3.50 to 5; tarsus 2.50 to 3.

104. Hudsonian Godwit. Limosa hæmastica (*Linn.*). (251)

Synonyms: Black-tailed Godwit, White-rump, Black-tailed Marlin.—Scolopax hæmastica, Linn., 1758.—Limosa hudsonica, Sw. and Rich., Nutt., Aud., and other authors, Limosa hæmastica of more recent writers.

Similar to the preceding but somewhat smaller, and with the rump and upper tail-coverts pure white, unspotted. This mark, together with the slender, nearly straight, but slightly up-curved bill, should identify the bird in any plumage.

Distribution.—Eastern North America and the whole of middle and South America. Breeds only in the far north.

Not common anywhere in the United States, probably less abundant than the Marbled Godwit. It is also more northern in its summer distribution, nesting in Arctic and sub-Arctic regions, for example, on the Barren Grounds of British America, in the Anderson River region, etc. In Michigan it occurs only as a very rare migrant and records are very few at best. According to Dr. Gibbs, the late D. D. Hughes had a specimen taken in Calhoun county in April, 1868. There is one (an adult in spring plumage) in the Barron collection at Niles, without data, but probably taken there. McIlwraith states that he has seen it in spring at St. Clair Flats, and also on the shore of Hamilton Bay (Ontario), where the specimen in his collection was obtained (Birds of Ontario, 1894, 149). Trombley records it from the shore of Lake Erie, near Monroe (Swales MS. List, 1904). It seems to be rare in neighboring states, although specimens have been recorded from Ohio, Indiana, Illinois, and Wisconsin. The latest instance of its nearby capture is a male taken at Point Pelee, Ont., north shore of Lake Erie, May 13, 1905, by P. A. Taverner.

It nests on the ground, laying four deep olive eggs, sometimes unmarked, but oftener spotted or mottled with darker brown, and averaging 2.20 by 1.42 inches.

TECHNICAL DESCRIPTION.

Tail black, with white base and tip, the tail-coverts with a broad white band. Summer adult: Head and neck pale chestnut, streaked with dusky; lower parts deeper chestnut, barred with dusky; back, etc., blackish, irregularly varied with buffy. Winter plumage: Back, etc. plain, dull brownish gray; head, neck and lower parts dull whitish or pale grayish buffy, shaded with brownish gray anteriorily. Young: Back, etc. dull brownish gray, each feather marked with a submarginal dusky crescent and margined terminally with buffy, the belly whitish and chest more grayish. Length 14 to 16.75 inches; wing 8.10 to 8.60; culmen 2.85 to 3.45; tarsus 2.25 to 2.50 (Ridgway).

105. Greater Yellowlegs. Totanus melanoleucus (*Gmel.*). (254)

Synonyms: Big Yellowlegs, Winter Yellowlegs, Tell-tail, Stone Snipe.—Scolopax melanoleuca, Gmel., 1789.—Gambetta melanoleuca, Bonap., 1856.—Totanus vociferus, Vieill., 1816.—Totanus melanoleucus of recent authors.

Figure 54.

The combination of the slender, straight bill about 2¼ inches in length, long yellow legs, and nearly white rump, always speckled more or less, is peculiar to this species.

Distribution.—America in general, breeding from Iowa and northeastern Illinois, etc. northward, and migrating south to Chili and Argentine Republic.

This and the Lesser Yellowlegs are two of the best known waders in the state. They are often found associated in large flocks on their feeding grounds, but when alarmed commonly gather in flocks by themselves as they take flight. Their favorite resorts for feeding are grassy or muddy pools, and they often collect in large numbers on sand-spits and sand-bars where they rest, preen their feathers, and feed listlessly here and there in shallow water.

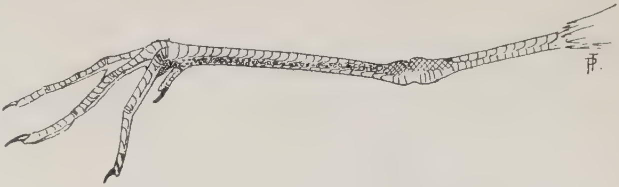

Fig. 54. Leg and Foot of Yellowlegs.

They are favorite birds with the gunner, who shoots them from a blind, attracting them to his decoys by means of the whistle, which they answer all too readily. Their ordinary call is a clear, mellow whistle, which can be heard at a great distance (at least a mile in favorable weather), and is written by Chapman as "Wheu, wheu-wheu-wheu-wheu, wheu, wheu-wheu." When answering the whistle, or when induced to return by the cries of their wounded or deserted comrades, they have a habit of floating quietly on extended wings for many seconds at a time, making a tempting mark for the gunner. They fly in rather compact flocks and often as they turn, their lower backs or rumps look pure white although really spotted with black.

This species is supposed to linger longer at the north than the Lesser Yellowlegs, and hence is called Winter Yellowlegs. As a matter of fact there seems to be little difference in the movements of the two species. They appear in Michigan in April, linger until the last of May, return again from the north in July, often by the middle, and remain through August, September, and occasionally well into October. It must not be supposed that any single bird or flock remains for any great length of time in the same place, but flocks linger a few days in a spot, pass on to the south and are replaced by others of their kind. Probably the heaviest flights occur during the first half of May and through the month of August.

It nests mainly north of the United States, but has been known to breed in northeastern Illinois (Nelson, Bull. Essex Inst. VIII, 128-129) and in southern Wisconsin (Kumlien and Hollister, Birds of Wisconsin, 1903, 49); however, there is no record of its breeding in Michigan. The nest is placed on the ground, in or near a marsh; the eggs are three or four, brownish buff, irregularly spotted with dark brown, and average 1.79 by 1.28 inches.

TECHNICAL DESCRIPTION.

Bill straight or slightly curved upward, the nasal groove extending less than half way to tip. Adult in summer: Upper parts mainly black or brownish-black and white, the white in streaks on head and neck, in bars and spots on back, scapulars and wing-coverts; rump and upper tail-coverts white or nearly so, with a few spots and bars of brown or black. Under parts mainly pure white, heavily spotted on lower throat and breast with black, the sides and flanks barred with black; tail barred with brown or black and white; primaries blackish, the outer one with a white shaft. Adult in winter: Similar but much lighter colored above; the head and neck mainly ashy gray, streaked with pale brown, the back, etc., olive brown, the edges of the feathers with alternate dusky and white spots; the lower throat, chest, sides of breast, and flanks more or less streaked and spotted with brown and ashy, but without distinct rounded black spots. Bill black or greenish black, legs and feet yellow. Length 12 to 15 inches; wing 7.50 to 7.75; culmen 2.20 to 2.30; tarsus 2.50 to 2.75.

The early spring migrants are variously intermediate in plumage between the winter and summer dress, but those which linger until June assume the nearly perfect breeding plumage. Autumn specimens are also more or less intermediate, but the winter plumage predominates.

106. Lesser Yellowlegs. Totanus flavipes (*Gmel.*). (255)

Synonyms: Yellowlegs, Summer Yellowlegs, Little Yellowlegs, Little Tell-tale, Yellowshanks.—Scolopax flavipes, Gmel., 1789.—Gambetta flavipes, Bonap., 1856.—Totanus flavipes, Vieill., and authors generally.

Known by its close resemblance to the preceding, and its smaller size. It has the same nearly straight bill, less than 1½ inches long, also the same yellow legs, and the white rump slightly barred with black.

Distribution.—America in general, breeding in the cold temperate and subarctic districts, and migrating south in winter to southern South America. Less common in western than in eastern North America.

In Michigan this bird has practically the same habits and distribution as the Greater Yellowlegs, which it so closely resembles, and with which it is commonly found. Its notes are practically the same, its feeding habits identical, and it answers the whistle, comes to the decoys, and behaves in every way precisely like its larger relative. The main difference observable is that the Lesser Yellowlegs is commonly much more abundant than the Greater Yellowlegs, being seen frequently in flocks of 100 or 200 individuals, while the Greater Yellowlegs is seen by dozens or scores.

In many localities it lingers until the first or even the second week in June, and by the middle of July flocks begin to return from the north. Mr. Swales noted the first migrants at Detroit on July 9, 1905, and Mr. J. Claire Wood says they were back July 1, 1906. Our latest fall record at Lansing is October 28, 1906, when a flock of eleven was found wading and swimming in a pool near the College.

Its nesting range seems to be precisely the same as for the Greater Yellowlegs, and like that species it has been found nesting in northern Illinois and in Wisconsin, but not in Michigan. The eggs are buff, distinctly spotted with dark brown and purplish gray, and average 1.73 by 1.14 inches.

Its food consists mainly of the smaller forms of animal life which abound in shallow waters, including large numbers of insects and insect larvæ. In Nebraska Professor Aughey found locusts in five stomachs taken in October 1874, as well as large numbers of other insects.

TECHNICAL DESCRIPTION.

Bill straight or very slightly curved upward, and nasal groove extending more than half way to tip. Colors of plumage, bill, and legs essentially the same as in the Greater Yellowlegs, the summer and winter dress varying also in the same way.

Length 9.50 to 11 inches; wing 6.10 to 6.65; culmen 1.30 to 1.55; tarsus 2 to 2.15.

107. Solitary Sandpiper. Helodromas solitarius solitarius (*Wilson*). (256)

Synonyms: Big Sandpiper, Tip-up, Teeterer.—Tringa solitaria, Wils., 1813.—Totanus solitarius, Aud., 1839, Coues, 1872.—Rhyacophilus solitarius, Cass. in Baird, 1858.—Totanus chloropygias, Vieill., 1816, Nutt., 1834.

Figure 55.

Slightly larger than the common Tip-up or Spotted Sandpiper, for which it is likely to be mistaken; but it is always darker above (sometimes quite black), never spotted below (though the chest may be clouded or indistinctly streaked in the fall), and the bill is black, slender, perfectly straight, and always a little over an inch long.

Distribution.—North America, breeding occasionally in the northern United States, more commonly northward, and migrating southward as far as the Argentine Republic and Peru.

Unlike most of our sandpipers this bird is essentially solitary in its habits and is never seen in compact flocks. Four or five may be found feeding on the edge of the same pool, and once or twice I have seen a score or more in the compass of an acre, but scattered among hundreds of other waders, thrown together by a common interest in the unusually good feeding ground.

While the Solitary Sandpiper frequents all the places in which the other sandpipers are found, it evinces a special preference for pools in the woods, and for marshy places which have become overgrown more or less with thickets and brush. Not infrequently it is found about the mossy, leaf-choked, branch-strewn puddles in the deep swamps, where the big trees shut out the sky above, and the Large-billed Waterthrush keeps it company among the decaying stumps and half submerged roots. When flushed it usually flies with unexpected swiftness, rises at a sharp angle to a height of several hundred feet, and then flies wildly for a moment or two, and often returns and alights near the place from which it started. Almost invariably it utters a sharp whistle of three or four notes as it rises, not particularly loud, but high-pitched, penetrating, and very characteristic. While feeding it runs about and bobs its head and tail somewhat like a common Tip-up, but the movements are much more abrupt and jerky, and there is far less of the graceful swinging motion so prettily shown by that bird.

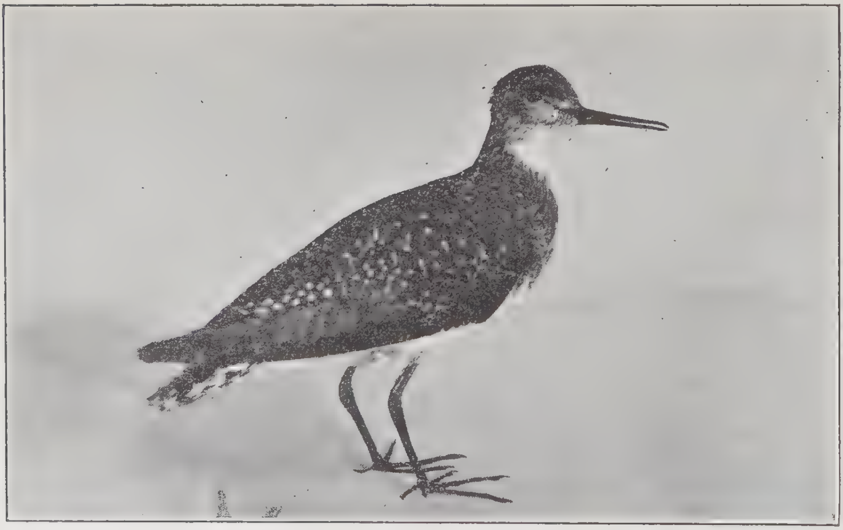

Fig. 55. Solitary Sandpiper.

From photograph of mounted specimen. (Original.)

Often when standing quietly otherwise it will jerk its head and body stiffly upward and back again, precisely as if moved by a hiccough.

It reaches southern Michigan the last week in April or the first in May, disappears by the first of June, returns from the north during the latter half of July and soon moves southward, although stragglers linger into or even through September. During the fall of 1906 this species was common at Lansing all through September, and 6 or 8 were seen October 3. In the northern half of the state a few remain all summer, and it is very likely that an occasional pair may nest even in the southern counties.

Singularly enough its nesting habits remain totally unknown, and although several collectors claim to have taken the eggs, there is no unquestionable specimen in any museum or private collection so far as we know. An egg is said to have been taken from a nest on the ground, at Lake Bomaseen, Vt., by Jenness Richardson, May 28, 1878 (Bull. Nutt. Club, III, 1878, 197); Dr. C. K. Clarke claims to have found a nest and eggs on Simcoe Island, Lake Ontario, June 10, 1898 (Auk, XV, 328, 329); and more recently Walter Raine records the taking of three sets of eggs in northern Alberta, one set in the summer of 1903, the other two in 1904, by Evan Thomson, one of his collectors (Oologist, XXI, 1904, pp. 165-167). The eggs from Alberta were taken from old nests of the Cedar Waxwing and the Robin, placed in trees several feet above the ground; the Vermont and Simcoe Island eggs were from nests on the ground. For one reason or another no one of these records is entirely satisfactory and it remains for some reliable ornithologist to clear up the mystery surrounding the nesting of this species. There is a growing belief that it always nests in trees, using the deserted nest of some other bird, a habit unknown in any American Sandpiper, but said to be the rule with the European Green Sandpiper, H. ochropus, which very closely resembles our bird.

TECHNICAL DESCRIPTION.

Bill slender, straight, black, longer than the head; legs and feet greenish black. Adult in summer: Olive-brown above, with a greenish cast, dotted or speckled with white; lower throat, chest, and sides of breast streaked with dusky; rest of under parts pure white; axillars barred with black and white; middle tail-feathers like the back, but spotted with white along the margins; other tail-feathers with about five narrow bars of black, the interspaces and tips white; primaries black with a purplish gloss, none of the shafts white on the upper side. Adult in winter: Similar, but with fewer white markings above, and the dusky streaks of throat and chest less distinct; a dark loral stripe, bordered above by a short white stripe. Young: Grayer about the head and neck, the top of head, back, and scapulars, thickly marked with dots of rusty or buff. Length 7.50 to 8.60 inches; wing 5 to 5.40; culmen 1.15 to 1.30; tarsus 1.25 to 1.90.

108. Bartramian Sandpiper. Bartramia longicauda (*Bechst.*). (261)

Synonyms: Bartram's Tattler, Upland Plover, Field Plover, Prairie Pigeon, Prairie Plover.—Tringa longicauda, Bechst., 1812.—Tringa Bartramia, Wils., Aud., Nutt.—Totanus Bartramius, Temm.—Actiturus Bartramius, Bonap.

Plate X.

The bill is too short for the ideal sandpiper and too long and slender for a plover. The lengthened tail, and the outer primary sharply barred with black and white are good recognition marks.

Distribution.—North America, mainly east of the Rocky Mountains, north to Nova Scotia and Alaska, breeding throughout most of its North American range; migrating in winter southward as far as Brazil, Peru (and Argentina (W. B. B.). Occasional in Europe.

This beautiful bird is one of the species which was formerly abundant throughout the state, but has become distressingly scarce within the last twenty years. Even ten years ago it was fairly common in suitable places throughout the Lower Peninsula, but at present we know of but few places where it breeds, and its voice during migrations is now seldom heard.

In the eastern states it frequents upland fields and hilly pasture lands by preference, and usually, if not always, nests in such places; but in Michigan, it frequently nests in wet grounds, although the nest itself is usually placed on one of the dryer spots. We have seen the birds nesting in two instances in good snipe-bogs where the mud was ankle deep and dry spots few and far between. Probably it still nests in favorable localities throughout the state, but only in small numbers.

As it is one of the early fall migrants, most of the birds leaving for the south before the middle of September, one would naturally suppose that it would have increased in numbers during the protection afforded by the game law which did not allow the shooting of Snipe, Woodcock or shore birds until October. So far as we can learn, however, there has been no increase in numbers and it has continued to decrease in most localities. At Plymouth, Michigan, Mr. Jas. B. Purdy states that it was formerly unknown, but has appeared and increased in numbers recently though still far from abundant.

It is an exceptionally good table bird and a favorite with amateur sportsmen, though it is very shy as a rule and does not decoy readily. Its mellow, plover-like call when migrating is well known and characteristic, but it has another and entirely different note when nesting, which Dr. Gibbs accurately describes as "much like the twitter of the tree frog."

The nest is placed on the ground, and the eggs are buffy white, spotted with brown and purplish gray, and average 1.79 by 1.30 inches. They are commonly laid during the latter half of May, but occasionally sets are found in June, and it is possible that second broods are sometimes reared.

This is one of the few North American birds which extends its migration to southern South America, being often extraordinarily abundant on the pampas of Argentina in November, December, and January. Both at that time and during our northern summer it feeds extensively upon grasshoppers and is one of the species which forms a natural check upon this scourge in some places. It is doubtful whether it is abundant enough in Michigan now to do much good in this way, but during the "grasshopper years" in Iowa, Minnesota, and Nebraska the Upland Plover or "Prairie Pigeon" was reported in scores of places as being one of the most important enemies of the grasshopper or Rocky Mountain locust.

TECHNICAL DESCRIPTION.

Adult: Top of head brownish black with an indistinct median stripe of buff; chin and upper throat white, rest of head and neck light brown or buff, streaked with dark brown or blackish; back, scapulars and wing-coverts, mottled black, brown and buff, most of the feathers black centrally, then brown, and with yellowish edges; rump and upper tail-coverts glossy black, without bars or spots; outer primary sharply barred with black and white, its shaft pure white; middle tail-feathers olive, barred with black, the others barred with light buff and black, tipped with white and conspicuously spotted with black near the ends; under parts pale buffy, fading to nearly pure white on belly and under tail-coverts, the lower neck sharply streaked with tear-shaped spots of black, which become arrow-

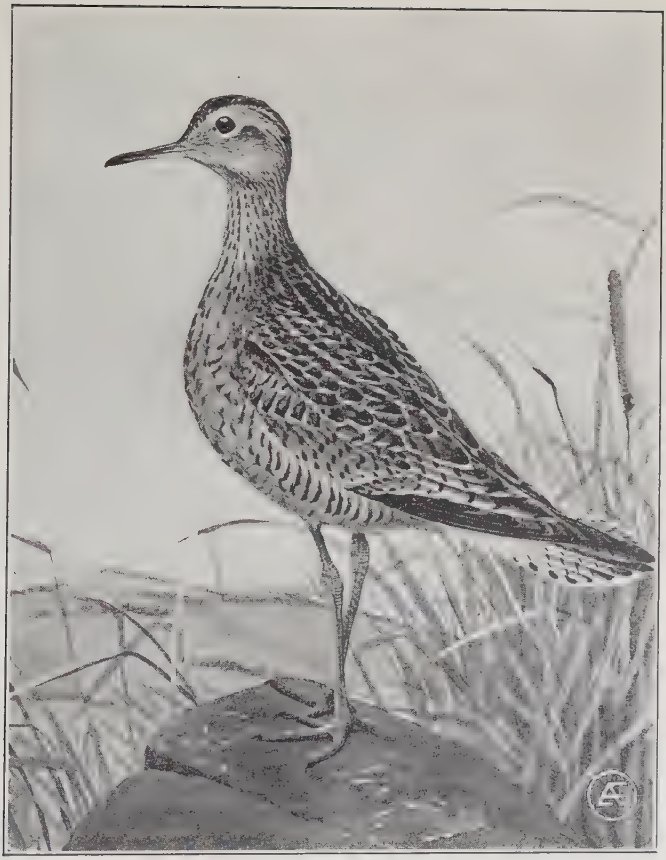

Plate X. Bartramian Sandpiper.

Courtesy of National Committee of Audubon Societies.

heads on the chest, brace-shaped on the breast and plain bars on the sides, the belly and under tail-coverts unmarked. Upper mandible and tip of lower black, rest of bill yellow; legs and feet gray or greenish gray. Sexes alike. Young: Similar to adult, but more yellowish or buffy, and the dark markings below fewer and less distinct. Length 11 to 12.75 inches; wing 6.50 to 7; culmen 1.10 to 1.15; tarsus 1.90 to 2.05.

109. Buff-breasted Sandpiper. Tryngites subruficollis (*Vieill.*). (262)

Synonyms: Tringa subruficollis, Vieill., 1819.—Tryngites rufescens of most authors.

A small sandpiper with much the form and habits of the preceding species, but not easily described for recognition by the novice. Reference to the detailed description will be necessary, and careful examination of the measurements and proportions.

Distribution.—North America, especially in the interior; breeds in the Yukon district and the interior of British America, northward to the Arctic coast; South America in winter as far as Uruguay and Peru. Of frequent occurrence in Europe.

This is a rare sandpiper in Michigan and very few specimens have been taken. Dr. Gibbs states that on September 17, 1875, he secured a pair, the only ones he ever saw. They were taken while hunting for Golden Plover on the Big Marsh one and one-half miles north of Kalamazoo. He further states that on September 14, 1882, B. F. Syke, of Kalamazoo, secured three specimens of this species and preserved one for his collection. There were but three in the flock; they were found on Grand Prairie, Kalamazoo county, and were very shy. There is a Buff-breasted Sandpiper (No. 20315) in the Kent Scientific Museum, Grand Rapids, but it was taken at Toronto, Ontario.

The above are the only records for the state of which I know, but Stockwell includes this species in his list of Michigan birds (Forest & Stream, VIII, 361). According to Kumlien & Hollister, it is one of the rarest shore birds in that state (Birds of Wisconsin, 1903, 51). It is also rare ordinarily in Indiana and Illinois, but in August 1874, Dr. A. K. Fisher found hundreds of them on the dry prairie at Maywood, Cook county Illinois, only ten miles from Chicago, and shot numbers of them (Cooke, Bird Migration in the Mississippi Valley, 1888, p. 97). There are also records for Ohio and Ontario, but the species is nowhere common.

It breeds in the far north, the Saskatchewan Plains and the Barren Grounds being favorite resorts. The eggs are buffy white, boldly spotted with dark bronze and purplish, and average 1.53 by 1.04 inches.

There is a record by McIlwraith (Birds of Ont., 1894, 156) of the nesting of this species at Dunville, Ontario, June 10, 1879, but it has transpired recently that this was a mistake and that the nest and eggs recorded really belonged to Wilson's Phalarope (Macoun, Cat. Canadian Birds, Part III, 1904, 732).

TECHNICAL DESCRIPTION.

No trace of webs between the front toes; bill barely as long as the head, or even shorter. "Upper parts dull grayish buff or brownish, varied with blackish; lower parts buff, streaked or speckled on chest with dusky; axillars white; under primary coverts and inner webs of quills [primaries] beautifully mottled or speckled with dusky on a whitish ground. Adult: Feathers of back, etc., blackish centrally, and without whitish borders. Young: Feathers of back, etc. distinctly bordered with whitish, the black and brown less sharply contrasted; mottling on inner webs of quills, and under primary coverts, much more minute and delicate than in adult. Length 7 to 8.90 inches; wing 5.10 to 5.50; culmen .75 to .80; tarsus 1.15 to 1.30" (Ridgway).

110. Spotted Sandpiper. Actitis macularia (*Linn.*). (263)

Synonyms: Sandpeep, Sand-snipe, River-snipe, Tip-up, Teeterer, Teeter-tail, Peetweet, Peep.—Tringa macularia, Linn., 1766.—Totanus macularius, Temm., 1815.—Tringoides macularius, Gray, 1849, and many others.—Actitis macularia, Naum., 1836, A. O. U. Check-list, 1895, and most recent authors.

Plate XI.

The adult is recognizable as the only sandpiper whose under parts are thickly marked with clean cut round spots or "polka-dots" of dark brown or black on a nearly white ground color. In addition, the living bird is always bobbing and balancing as it sit or runs, and when in flight always shows conspicuous white bars on the wings.

Distribution.—North and South America, from Alaska south to southern Brazil. Breeds throughout temperate North America, less commonly on the Pacific coast. Occasional in Europe.

This is the common Sandpiper or Tip-up of streams and ponds during the summer, and is almost universally distributed, from the southern border to Lake Superior. It never occurs in flocks, always singly, in pairs, or at most in little family parties of five or six, the young then distinguishable by the unspotted breast. It is a late comer in spring, seldom arriving before the first of May, sometimes not until the middle of the month; and rarely remains after the middle of September. It is oftenest seen along the edges of small ponds and streams, but occurs also along the sandy beaches of the Great Lakes, and about the little mud-holes and ditches in upland pastures far from any large body of water.

It nests almost anywhere on the ground; not always near the water, but in pasture, wheatfield, sand-bank, or in the wrack along the shore. The nest is often well built, but at other times is hardly more than a hollow scraped in the ground, with a few grass stems between the eggs and the soil. Eggs are rarely found, even in the southern counties, before the third week in May, and the larger number appear to be laid between the first and fifteenth of June. Mr. E. A. Doolittle records three nests of four eggs each, found June 28, July 2, and July 5, 1906, on Grand Island, Lake Superior. He considered these to be second sets, but if so it would not indicate second broods but only that the first set of eggs had been lost by accident and the birds had made a second trial. Possibly no part of the life history of our common birds has been so much neglected as this question of second broods, and careful studies in this direction would well repay the investigator. The eggs are almost invariably four in number, seldom three or five, and are buffy or soiled white, spotted and speckled with brown and black. They average 1.25 by .90 inches.

The characteristic note of the bird is usually written "peet-weet" and when the bird is alarmed or is calling anxiously to its mate or young it sounds like p'weet'-p'weet'-p'weet'. When followed along the shore the bird flies ahead 30 to 50 yards at a time, and almost always prefers to fly out over the water rather than over the sand. After being followed some little distance it is likely to turn back, making a larger loop than usual, and return to that part of the shore from which it was first driven. It often alights on stumps, fence-posts and rails, as well as on boulders and small rocks; and wherever it may be it keeps up the constant balancing, teetering motion, which is by no means confined to this species, yet is carried to such an extreme as to have given the bird several of its vernacular names.

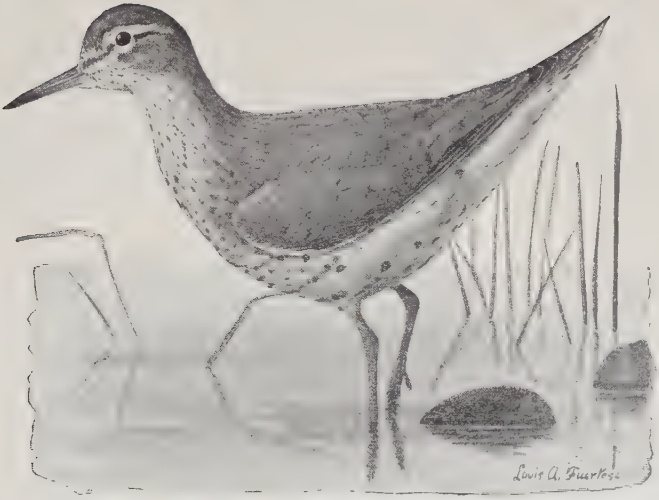

Plate XI. Spotted Sandpiper.

From Coues' Key to North American Birds. (Courtesy of Dana Estes & Co.)

The Spotted Sandpiper feeds until late in the evening, and possibly is more or less nocturnal, since its notes are frequently heard at night when it cannot be migrating. Its food consists largely, if not entirely, of animal matter, including small aquatic forms of every kind, but it also eats insects of various sorts, and according to S. E. White, at Mackinac Island, it was observed to feed on "stone spiders." Aughey found it feeding freely on locusts in Nebraska in May, 1895, six stomachs containing an aggregate of 91 of these injurious insects.

TECHNICAL DESCRIPTION.

Bill about as long as head, stout, slightly decurved, largely yellow toward the base, the tip and culmen blackish; legs and feet greenish brown. Adult in summer: Entire upper parts grayish or greenish brown, usually with a brassy luster, the head and neck more or less streaked and the back and scapulars spotted and barred with black; a dusky loral streak (continued back of the eye) bordered above by a whitish stripe; under parts nearly pure white, rather thickly dotted with rounded black or dark brown spots, smallest on chin and throat, largest on breast and sides; middle tail-feathers olive brown like the back, sometimes barred with black, lateral feathers barred with black and white, and with broad white tips; wing with two conspicuous white bands, one formed by the white tips of the secondaries, the other by the inner webs of most of the primaries and the basal half of all the secondaries. Adult in autumn: Without any spots below, and with few or no black bars above, but sides of breast shaded with gray. Young: Similar to autumn adult, and unspotted below, but with narrow bars of buff and dusky on tips of many upper tail-coverts, scapulars and wing-coverts. Length 7 to 8 inches; wing 4.05 to 4.60; culmen .90 to 1.05; tarsus .90 to 1.05.

111. Sickle-billed Curlew. Numenius americanus *Bechst.* (264)

Synonyms: Sickle-bill, Long-billed Curlew, Big Curlew, Hen Curlew.—Numenius longirostris, Wils., 1814, and authors generally.—Numenius rufus, Vieill.—Numenius occidentalis, Woodh.

Known at a glance by its strongly down-curved bill, from five to eight inches long, and its mottled brown and gray plumage. The only other bird with a similarly curved bill of this length is the Glossy Ibis, which is readily separable by its metallic green, bronze, and chestnut plumage.

Distribution.—Temperate North America, migrating south to Guatemala, Cuba and Jamacia. Breeds in the South Atlantic States, and in the interior through most of its north American range.

Doubtless this species was once fairly common in the prairie regions of southern Michigan before the country was thoroughly cultivated. Recent records for the Great Lake region are few and far between, and I am unable to find a single instance of its nesting within our limits, although we find the statement in Baird, Brewer and Ridgway's "Water Birds" (Vol. I, 1884, 314). "It is now known that they probably breed in all or nearly all the western states north of Ohio and west of Lake Erie."

A. B. Covert records the capture of a male in Washtenaw county, September 12, 1872, and another specimen taken near Ann Arbor "about September 15, 1877." According to Norman A. Wood this last specimen is mounted and now in the collection of the University of Michigan. A mounted specimen, without any label, in the collection of the St. Mary's Academy, Monroe, Michigan, is said to have been collected in that vicinity, and to have come from the collection of Father Kilroy. Mr. Ed. Van Winkle, of Van's Harbor, Delta county, says that he has taken specimens there but that they are rare.

The above constitute our only records for the species, although according to Dr. Gibbs one instance of its capture was cited by D. D.

Hughes in his manuscript Ornithology of Michigan, but without exact time or place. It is also mentioned by Stockwell (Forest and Stream, VIII, 22, 361).

According to Butler "It is a rare migrant (in Indiana), formerly more numerous, and perhaps occasionally breeding in the northern part of the state" (Birds of Indiana, 1897, 732). It was formerly abundant in Illinois, and in Wisconsin, but has become rare of late years in both states. Nelson says that a few nested on the Calumet marshes in northern Illinois in the spring of 1873 (Bull. Essex Inst., VIII, 1876, 130). McIlwraith calls it an irregular visitor in western Ontario.

It nests on the ground, laying three or four eggs, which are grayish buff or buffy brown, spotted with darker brown, and averaging 2.59 by 1.81 inches. The nests are sometimes placed along the shore, sometimes on dry ground at a considerable distance from water; in the interior usually on the dryer parts of the prairies. The nest is a mere hollow in the ground, scantily lined with grasses.

The food is varied, but includes a large proportion of insects, as well as berries, seeds, and various crustaceans and other aquatic animals. In Nebraska Professor Aughey examined ten stomachs between 1868 and 1876, and eight of them contained Rocky Mountain locusts, the number varying from 51 to 70 in a stomach (1st Rep. U. S. Entom. Com., Appendix 2, 55).

TECHNICAL DESCRIPTION.

Adult: Bill five to eight inches long, strongly decurved; top of head streaked with buffy and black without any median light stripe; back cinnamon or grayish barred transversely with blackish; secondaries and inner vanes of primaries rufous or cinnamon; under parts varying from buffy brown to reddish brown or cinnamon; the neck and sides of breast more or less streaked or barred with blackish, the axillaries plain cinnamon or rufous with few or no black bars. Bill blackish, the base of the lower mandible flesh-color; legs bluish gray. Length 20 to 26 inches; wing 10 to 12; culmen 5 to 8.50; tarsus 2.25 to 3.50. Sexes alike and little seasonal change in plumage. The bill varies immensely with age, being only 2.50 to 3 inches long in young of the year and reaching a length of 5 or 6 inches the following season.

112. Hudsonian Curlew. Numenius hudsonicus *Lath.* (265)

Synonyms: Jack Curlew, Jack, Short-billed Curlew, Striped-head.—Numenius hudsonicus, Lath., 1790, and authors generally.

Plate XII.

Known by the strongly decurved bill, which, however, is only from three to four inches in length, together with the buffy and brown striped and spotted plumage which is similar in all the curlews.

Distribution.—All of North and South America, including the West Indies; breeds in the high north, and winters chiefly south of the United States.

This is the least rare of our curlews, yet it is by no means a common bird at present. When it occurs at all it is likely to be found in flocks of considerable size, but it also associates freely with the Golden and Black-bellied plovers, and a single curlew is not infrequently seen in a large flock of plover. B. H. Swales says "One record. On May 25, 1902, I met with a flock of fully 200 birds at St. Clair Flats. My companion, C. H. Alice, secured one male, which is mounted and in his possession. This flock was commented on by several of the resident gunners as the only curlews they had ever seen" (MS. List, Birds of S. E. Michigan, 1904). There is a

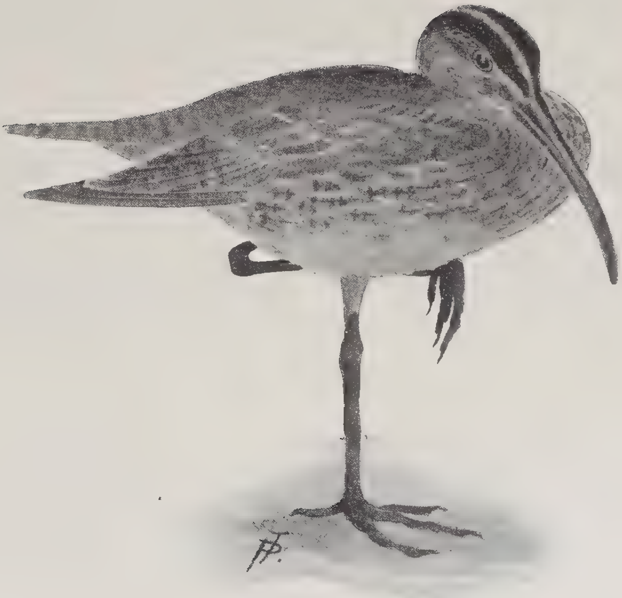

Plate XII. Hudsonian Curlew.

From drawing by P. A. Taverner. (Original.)

mounted specimen in the collection of the Michigan Agricultural College, obtained from Mr. Peter Lepp, Saginaw, Mich., which he says was taken in the fall of 1896, just outside Saginaw City. It was "leading a flock of Golden Plover" and the only bird of the kind in the flock. We have a second specimen taken by Albert Hirzel, at Forestville, Sanilac county, April 23, 1906. There is also a mounted specimen (No. 20261) in the Kent Scientific Museum, Grand Rapids, marked as local, but without other data.

In Indiana, according to Butler, it is much rarer than the Long-billed Curlew. In Wisconsin, according to Kumlien and Hollister, "it has certainly been decidedly rare during the past thirty years, even in migrations, and we have not seen a single specimen for twelve years" (Birds of Wisconsin, 1903, 52).

The species nests only in the far north, and its eggs are pale olive, spotted with brown, and average 2.27 by 1.57 inches.

TECHNICAL DESCRIPTION.

Adult: Top of head brownish black, with a median stripe of buffy or grayish white; a similar but broader light stripe from bill over eye to nape, bounded below by a dusky loral and post-ocular stripe; chin and upper throat white or whitish, without markings; rest of throat, neck and breast grayish or buffy white thickly streaked with brownish black, the sides, flanks and under tail-coverts barred with the same; belly mostly unspotted; back and scapulars brownish black, spotted with buffy white, the wing-coverts similar but the lighter color predominating; primaries sharply barred on inner webs with buffy white and dusky; the axillaries buffy or cinnamon, sharply barred with blackish; upper mandible brown, lower mandible yellowish, especially toward base. Sexes alike, and seasonal changes slight; young of year hardly different from adults. Length 16.50 to 18 inches; wing 9 to 10.25; culmen 3 to 4; tarsus 2.25 to 2.30.

113. Eskimo Curlew. Numenius borealis (*Forst.*). (266)

Synonyms: Little Curlew.—Scolopax borealis, Forst., 1772.—Numenius brevirostris, Licht., 1823.—Numenius borealis, Lath., 1790, and authors generally.

Known by its close resemblance to the Hudsonian Curlew, but the strongly decurved bill is still shorter, averaging only 2¼ inches; the general tone of the plumage is also more reddish.

Distribution.—Eastern North America, breeding in the Arctic regions, and migrating south throughout South America.

Formerly this curlew was more abundant and better known than either of the others. It appeared in large flocks during migration, and frequented dry fields and such situations as are preferred by Golden Plover. It was much hunted for its flesh, which was considered superior to that of the other curlews. Up to about 1890 it probably occurred with more or less regularity both spring and fall, and there are several well attested records of its capture. According to Gibbs (MS. List) B. F. Syke secured a female on the north marsh at Kalamazoo, October 28, 1879. It was the only one seen. In a letter to Dr. Gibbs the late W. H. Collins of Detroit said "It is quite common in Detroit markets spring and fall. Two specimens taken at St. Clair Flats in the spring of 1883; have had a number."

In northeastern Labrador, where this species formerly collected in immense numbers in the late summer and early fall, they almost totally disappeared in 1894, and have been very rare ever since. Up to 1894, they had remained in large numbers in spite of the persecution to which they were subjected (Bigelow, Auk, XIX, 1902, 29). At present the species seems to be on the verge of extinction, possibly the last one has been killed already. The last specimen taken, so far as we know, was killed at Hog Island, Hancock county, Maine, Sep. 2, 1909 (O. W. Knight, Auk, XXVII, 1910, 79).

The food of all the curlews consists partly of animal matter and partly of vegetable material, and the present species is known to feed freely on locusts, grasshoppers, crickets, and a large variety of other insects, as well as on various seeds, grains and berries. It formerly visited Labrador after the breeding season, largely to feast on the crow-berry or curlew-berry (Empetrum nigrum), and some other abundant berries before starting on its long journey southward.

This is another of the species which formerly reached southern Argentina and even Patagonia on its southward migration. The writer saw it in flocks of hundreds on the Argentine Pampas in January and February, 1880 and 1881.

It formerly bred in large numbers on the Barren Grounds, within the Arctic Circle, laying three or four spotted eggs in a poorly lined hollow in the ground. The eggs average 2.04 by 1.43 inches.

TECHNICAL DESCRIPTION.

Top of head uniformly streaked with brownish black and grayish or buffy white, without any median light stripe; an indistinct light stripe from bill over eye; remainder of head and neck buffy white, narrowly streaked with dusky or brownish black, the markings becoming arrow-shaped or v-shaped on the lower throat and breast, the sides and flanks with larger bars of the same color. Inner webs of primaries uniform brownish without bars. Length 12.60 to 14.50 inches; wing 8 to 8.50; culmen 2.25 to 2.50; tarsus 1.70 to 1.80.

Family 27. CHARADRIIDÆ. Plover.

KEY TO SPECIES.

A. Large, wing over 6 inches, bill nearly or quite 1 inch. B, BB.
  B. Three-toed, hind toe lacking. C, CC.
    C. Wing not over 6¾ inches; neck encircled by a broad white ring with a black ring below it. Killdeer. No. 116.
    CC. Wing more than 6¾ inches; neck without rings. Golden Plover. No. 115.
  BB Four-toed, hind toe short but distinct. Black-bellied Plover. No. 114.
AA. Small, wing not over 5 inches; a complete white ring around neck, with a dark collar below it. E, EE.
    E. General color of upper parts (back, etc.) pale gray or even grayish white. Piping Plover. No. 118.
    EE. General color of upper parts dark brownish gray. Ringneck. No. 117.

114. Black-bellied Plover. Squatarola squatarola (*Linn.*). (270)

Synonyms: Gray Plover, Beetle-head, Black-breast, Four-toed Plover. -Tringa squatarola, Linn., 1758, T. helvetica, 1766.—Squatarola helvetica, Cuv., 1817, and authors generally.—Charadrius helveticus, Licht., Nutt., Aud.—Charadrius apricarius, Wils.

Likely to be confounded in any plumage with the Golden Plover which it closely resembles. With specimens in hand, however, they can be instantly separated by examination of the feet, since the present species has a distinct hind toe in addition to the three front toes, while the Golden Plover lacks the hind toe altogether. In spring the black breast and belly have given it the name of Black-breast, while the general gray color in the fall is sufficient reason for the name Gray Plover. Of course the Golden Plover is in very similar dress at corresponding seasons, but the Golden Plover, as its name implies, shows many dots and markings of yellow in the gray upper parts, especially on the top and back of the head and the lower back.

Distribution.—Nearly cosmopolitan, but chiefly in the Northern Hemisphere, breeding far north, and migrating south in winter, in America, to the West Indies, Brazil, and Colombia.

In Michigan this is not an uncommon species during the fall migration, but there are few records for spring. Dr. Gibbs states that the late D. D. Hughes took a single specimen in spring (presumably in Calhoun county) many years ago, and Mr. Albert Hirzel, of Forestville, Sanilac county, took an adult male there May 2, 1905, which is now in the Agricultural College museum. The earliest record in the fall is that of a specimen taken near Greenville, Michigan, August 10, 1893, and another August 16, 1897, by the late Percy Selous. A few have been taken in September (Sept. 26, Bay county, N. A. Eddy), but the majority are found in October (Oct. 5, Bay City, Oct. 29, Kalamazoo, Oct. 5, Ann Arbor, and Oct. 1895, Greenville). Mr. N. A. Eddy found one in the market at Bay City, November 25, 1893, an unusually late record.

Norman A. Wood found this species fairly common on the Charity Islands, at the mouth of Saginaw Bay, from Aug. 20 to Sep. 10, 1910. Among the earliest to come from the north were five adults in almost perfect spring plumage (under parts black), while after Sep. 26, only young birds, in the gray plumage, were seen. Some of these remained until Oct. 7, but the light-keeper said he shot some on Nov. 21, 1909. (Wilson Bulletin, XXIII, 1911, 91).

The bird sometimes associates with the Golden Plover, but is often seen in small flocks by itself. It has much the same habits as the Golden Plover, but seems more inclined to frequent the lake shores and wet places generally, while the latter bird is more often seen on the dryer uplands. Both species feed largely on seeds, berries, grasshoppers and other insects, and their flesh is much better after a season of such diet, while a ranker and even a fishy taste may result from their feeding along the shore or on fresh water mud flats.

This species breeds in the far north, laying three or four "light buffy olive eggs, spotted with brown and black, and averaging 2.04 by 1.43 inches" (Ridgway).

TECHNICAL DESCRIPTION.

Toes three in front, one behind, the latter short but distinct. Bill shorter than head, stout, acute, black. Adult in late spring and summer: Brownish black or dusky above, darkest on crown and lower back, everywhere speckled or barred with white; lower parts mainly clear black, including the sides of head above the eyes, and the sides of the neck to the middle line; only the sides of breast, the anal region, under tail-coverts, and thighs white; black of the throat and neck sharply divided from the gray of the upper parts by a white stripe along the sides of the neck, which gradually shades into the gray; rump and upper tail-coverts mostly white with a few dark bars; tail with numerous black and white bars; axillaries plain black. Adult in autumn and winter: Upper parts much as in summer, but lower parts without trace of black, the lower neck and sides of breast alone streaked or mottled with brownish or grayish ash, the rest of under parts nearly pure white, but the axillars always black. Young: Similar to adult in winter, but upper parts more or less speckled with buffy or pale yellow. Iris dark brown, bill, legs and feet, black Length 10.50 to 12 inches; wing 7.50; culmen 1.10; tarsus 1.95.

115. Golden Plover. Charadrius dominicus dominicus (*Mull.*). (272)

Synonyms: American Golden Plover, Bull-head, Golden-back, Black-breast, Field Plover, Prairie Pigeon.—Charadrius pluvialis, Wils., 1813, Sw. & Rich., Aud., Nutt.—C. virginicus, Licht., Cass., Baird.—C. fulvus var. virginicus, Coues, 1872.

Plate XIII and Figure 56.

In fall plumage similar to the preceding, but the upper parts usually show numerous spots of dull yellow or buffy white which gives it the name Golden Plover. Of course the absence of the hind toe will always separate it from the Black-bellied Plover.

Distribution.—Arctic America, except coast of Bering Sea, migrating southward throughout North and South America to Patagonia.

This bird is better known to sportsmen than most other shore birds owing to the fact that it is found in high dry regions, as well as along the shores and marshes. It is commonly seen in large flocks from September to November, but the larger number appear during the latter half of September and linger for a month or more. These appear to be mainly young of the year, and they are in the gray plumage characteristic of the young birds. It seems certain that the old birds pass south in August and early September, and that a large part of them travel along the sea coast, or even over the open sea, past Bermuda and the Lesser Antilles, to the north coast of South America. On the return trip in spring the great majority, young or old, travel west of the Mississippi River, and it is exceptional to meet with the species in spring anywhere in the eastern states. This is true also of Michigan, and although several observers have reported it as seen in spring, I have not been able to find a spring specimen in any collection in the state, and it seems likely that these reports may be incorrect. It has been reported in the fall from nearly every point in the Lower Peninsula where we have correspondents, and it formerly was abundant about Saginaw Bay and along the St. Clair and Detroit Rivers, as well as on the west side of the state, and at several points in the interior, including Ingham and Kalamazoo counties.

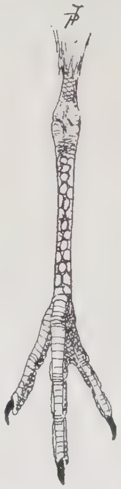

Fig. 56. Foot of Golden Plover, showing reticulate tarsus.

Sometimes the flocks are very large, several hundred or even a thousand birds feeding and flying together. They are apt to be wary and hard to approach, and gunners often use a horse, or a horse and wagon, for approaching them. They are always good eating, and especially so in autumn when they have fed for a few weeks on seeds, berries, and insects, at a distance from salt water. They are very swift in their flight and when in migration flock after flock will pass over the most attractive country without alighting. Although they undoubtedly migrate at times by night, great flights have been seen by day, and on the plains of southern

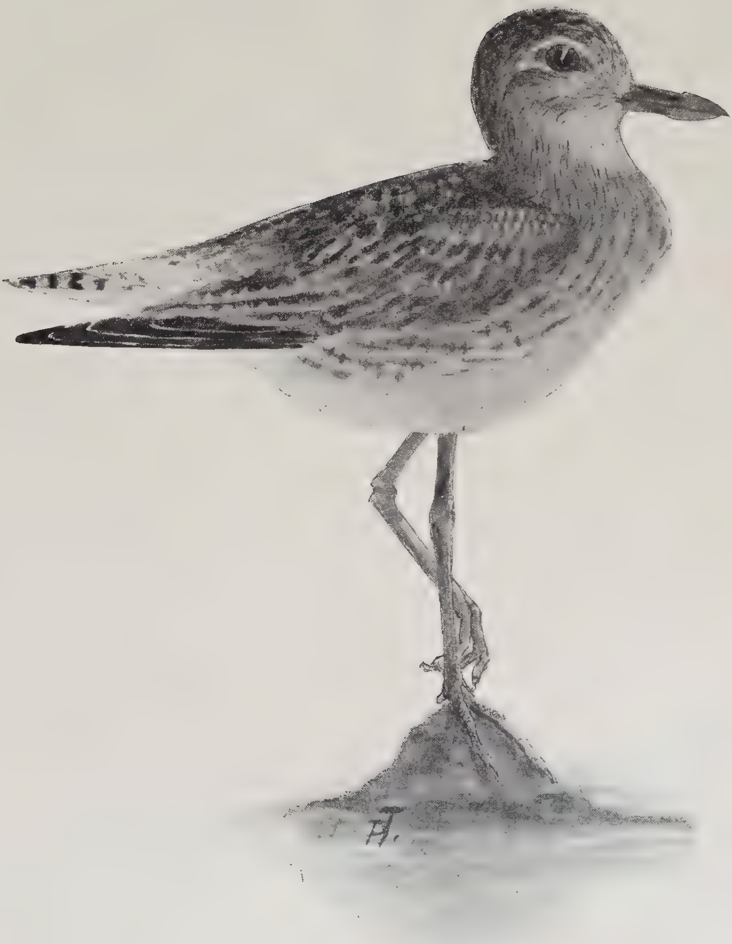

Plate XIII. Golden Plover. Fall plumage.
From drawing by P. A. Taverner. (Original.)

South America the writer has sometimes seen flocks pass in rapid succession for many hours at a time.

Although they extend their migrations to all parts of the southern hemisphere, even to Australia and Patagonia, they are not known to nest anywhere except in Arctic regions, the American form nesting largely in Alaska and British America to the northwest of Hudson Bay. Three or four eggs are laid in a slight hollow in the ground. They are buff, grayish olive, or brownish, and spotted with brownish black. They average 2.07 by 1.40 inches.

TECHNICAL DESCRIPTION.

Similar in all its plumages to the Black-bellied Plover, except in three respects, viz.: The hind toe is always absent, the axillars are pale smoky gray instead of clear black, and the upper parts are always distinctly spotted with buffy or pale yellow. This latter pattern is seen also in the young Black-belly, but the yellow spots then are fewer and duller. Length 9.50 to 10.80 inches; wing 6.80 to 7.40; culmen .80 to 1; tarsus 1.55 to 1.82.

116. Killdeer. Oxyechus vociferus (*Linn.*). (273)

Synonyms: Noisy Plover.—Charadrius vociferus Linn., 1758, Wils., Nutt., Aud.—Aegilitis vociferus, Bonap., Cass., Baird, Coues.—Oxyechus vociferus, Reich., 1853, Ridgw., 1881.—Charadrius torquatus, Linn., 1766.

Figure 57.

Unique among our plover in having two black bands across the upper breast, and the rump and upper tail-coverts bright cinnamon brown.

Distribution.—Temperate North America, breeding north to Newfoundland and Manitoba, migrating to the West Indies and Central and northern South America. Bermuda.

The Killdeer is too well known to merit any extended notice. It spends the entire warmer half of the year with us, arriving from the south as soon as any considerable amount of bare ground appears in the spring, and lingering in autumn until the first snow falls. Probably the greater number arrive during the last of March and first of April and depart toward the end of September, but considerable numbers come earlier and stay later.

The Killdeer frequents wet and dry places alike, but it shows a decided preference for newly plowed fields and especially for the edges of the shallow muddy pools which abound everywhere throughout the state. It is one of the noisiest of the shore birds, and in Coues new Key we find the name Noisy Plover given as one of its synonyms. Though not exactly a gregarious bird, it is seldom found alone, being most often seen in little companies of two to eight, except during the nesting season when it is found only in pairs.

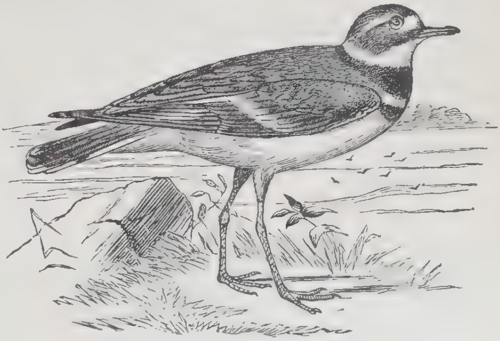

Fig. 57. Killdeer.
From Baird, Brewer and Ridgway's Water Birds of North America. (Little, Brown & Co.)

The nest is a mere hollow in a cornfield, pasture, or almost any open field and usually there is little in the way of lining for the nest, merely a few grass blades or weed-stalks, or sometimes only a few smooth pebbles. Commonly the eggs are three or four, surprisingly large for the size of the bird, and dull buffy white, thickly spotted with black. They measure 1.47 by 1.04 inches.

This bird has an exasperating habit of signaling the approach of a stranger, or indeed of any individual which it chooses to consider an intruder. Often it will fly half a mile with loud outcries to meet and scold the sportsman who is trying to get within shot of a flock of ducks, and it will follow a man or a dog from one field to another during the nesting season, calling attention to the enemy by its loud outcries. If the nest be approached the bird redoubles its complaints, and if the young or eggs are discovered will throw itself on the ground before the intruder and feign lameness or serious injury in the attempt to draw him away. Both young and old have the habit of squatting and remaining quiet under certain circumstances, but they are much more likely to rush into danger than to try to avoid it.

The Killdeer is not considered a good table bird, and the few which are killed by gunners are shot commonly in anger or merely for the sake of practice in wing shooting.

From the fact that the eggs are found in May or June (occasionally even in April in southern Michigan), and often again late in July, it seems probable that this species rears two broods, but it is exposed to so many dangers, and in particular it persists so obstinately in nesting in fields which are soon to be plowed, that the nests found in July may indicate only second or third attempts to rear a brood.

After the nesting season Killdeers frequently collect in flocks of twelve to thirty and frequent the edges of ponds and streams, sometimes associating with other shore birds. Although most abundant in cultivated districts, the species is fairly well distributed over the entire state and no doubt nests in every part of the state where conditions are at all favorable.

The Killdeer is a voracious insect eater and is particularly valuable to the farmer on account of its fondness for grasshoppers and for the insects of cultivated land. It eats some seeds it is true, but we have never heard a complaint of injury to wheat or any other grain, and it doubtless confines its seed eating largely to grass seeds and weed seeds. Aughey took as many as 49 locusts from a single Killdeer's stomach in Nebraska, and the average in six stomachs was 44.

TECHNICAL DESCRIPTION.

Adult: Bill shorter than head, straight, stout; forehead, chin, and broad ring round upper neck, pure white; below the white collar is a black band, broadest in front, very narrow at the back where it is sometimes incomplete; below this is a white crescent across the chest, bounded below by a broad black band across the breast; rest of under parts pure white; a black bar across front of crown, and a blackish stripe from base of bill across side of head, bounding the white collar above; a white stripe back of the eye, usually ending in buff; top of head and middle of back brownish gray, the feathers often tipped with rusty; lower back, rump and upper tail-coverts light buff to deep rust-red; tail long, much graduated, the middle feathers blackish, tipped with brown, the outer feathers white or buffy white at base, with sub-terminal black spaces and broad white tips; a conspicuous white wing-bar, and both primaries and secondaries with large white patches. Iris brown, eye-lids bright orange-red, bill black, feet and legs yellowish. Sexes alike, and little seasonable change in plumage, but young birds in the fall show numerous rusty-edged feathers on the back and wings. Length 10 to 11.25 inches; wing 6.20 to 6.75; tail 3.60 to 4.10; culmen .70 to .90; tarsus 1.40 to 1.55.

117. Ring-necked Plover. Ægialitis semipalmata (*Bonap.*). (274)

Synonyms: Semipalmated Plover, Ring-neck, Ring Plover, Beach Bird.—Charadrius semipalmatus, Bonap., 1825.—Ægialitis semipalmatus, Cab., 1856, and authors generally. —Tringa hiaticula, Wils.

Figure 58.

A small plover readily known by its grayish brown back and the complete white collar above a similar black one of about the same width.

Distribution.—Arctic and Subarctic America, migrating south throughout tropical America, as far as Brazil, Peru and the Galapagos.

A common bird of the lake shores in spring and again in late summer, and regularly, though less often, seen along the shores of streams and about mud flats in the interior of the state. It arrives from the south during May, lingers until after the first of June (sometimes until after the middle). goes north to breed, and is back again by the middle of July, remaining here and there through August and September. Sometimes it is seen in pairs or even singly, but usually it appears in small flocks of six to thirty individuals, and these feed and fly together, seemingly unwilling to be separated even for a moment.

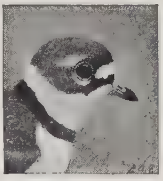

Fig. 58. Ring-necked Plover. From Bailey's Handbook of Birds of the Western U. S. (Houghton, Mifflin & Co.

Unlike most of our plover this species seems to be unhappy away from water, and I do not remember ever to have met with it except along the water's edge. It associates commonly with sandpipers and other shore birds and we have found it in Ingham county almost always with the Least Sandpiper and the Semipalmated. In Nebraska, however, it must frequent the prairies as well as the margins of ponds and streams, for Professor Aughey found it feeding freely on the Rocky Mountain locust in 1865, 1874 and 1875, and every stomach examined in those years contained large numbers of these locusts, with comparatively few other insects; the average number of locusts in each stomach was fifty-three (1st Rep. U. S. Entom. Com., App. 2, p. 49).

There is no likelihood at all that it ever nests within our limits, and it is not possible that the birds which leave us late in June are the same which return by the middle of July; on the contrary, it is probable that those which return to us earliest are the ones which went north early in May, while those which linger with us until June do not reappear until September. This, however, is mainly conjecture.

It nests in the far north, and a nest described by Eifrig (Auk, XXII, 1905, 239) was found at Fullerton, on Hudson Bay, July 1, 1904, and was a mere hollow in the sand without any lining whatever. It contained four eggs which were "light brown with a slight green tinge and numerous roundish blackish umber and lilac spots and dots." According to Ridgway the eggs measure about 1.26 by .94 inches.

TECHNICAL DESCRIPTION.

Adult male in summer: Forehead white, bordered behind by a black bar across the crown; remainder of crown, occiput, and nape grayish brown; chin, throat, ring round neck, and most of under parts pure white; a black band across the upper breast, extending backward almost around the neck, but seldom complete; back and upper surface of wings and tail grayish brown; primaries blackish on the outer webs and at tips, but with white shafts; outer pair of tail-feathers entirely white, next two or three pairs white at base and tip, with a blackish sub-terminal bar, middle feathers like the back, but blackening at tip. Bill black at tip, orange at base; legs yellowish. Female: Similar, but most of the black areas duller or browner. In winter plumage all the black is replaced by grayish brown, but this is darker than the remaining areas, so that the pattern of coloration is similar.

Length 6.50 to 7.50 inches; wing 4.65 to 5; culmen .48 to .55; tarsus .95 to 1.05.

118. Piping Plover. Ægialitis meloda (*Ord*). (277)

Synonyms: Pale Ring-neck, White Ring-neck, Belted Piping Plover, Western Piping Plover.—Charadrius melodus, Ord., 1824, Bonap., Nutt., Aud.—Aegialitis melodus, Cass., Baird, Coues, Ridgw.—Aegialites melodus circumcinctus, Ridgw., 1881.

With a close general resemblance to the Ring-necked Plover, this bird may be known at once by the pale brownish gray tint of the upper parts and the black or dark collar which sometimes completely encircles the neck (var. *circumcincta*), but usually is broken in front (typical *meloda*).

Distribution.—Eastern North America. Breeds locally from southern Saskatchewan, southern Ontario, Magdalen Islands and Nova Scotia south to Central Nebraska, northwestern Indiana, Lake Erie, New Jersey and Virginia.

This little plover is found everywhere along the shores of the Great Lakes during summer, and probably breeds wherever conditions are suitable.

In 1874 Ridgway described a variety of this species which he named *circumcincta*, in which the black collar was continuous across the chest instead of being interrupted there by white as in the common form. This new variety was said to be "chiefly restricted to the Missouri River region," but was found later to occur more or less regularly throughout the Great Lake Region and less often in the eastern states. The form was recognized by the American Ornithologists' Union, under the name Ægialitis meloda circumcincta, the Belted Piping Plover, and has figured as a distinct sub-species for the last thirty years. Recently, however, sufficient evidence has accumulated to make it clear that the two supposed forms intergrade completely and occupy practically the same territory, so that the belted form is no longer considered a distinct sub-species and the last check-list of the American Ornithologists' Union (1910) recognizes only the Piping Plover, as above.

The typical form (*meloda*) is common along the north shore of Lake Erie, and has been found breeding in some numbers at Point Pelee, near the western end of that lake (Birds of Ontario, 1894, 165). According to Covert it is fairly common during migrations in Monroe county, and nests at the Monroe Marshes (probably along the beach of Lake Erie). The writer found two specimens on Little Traverse Bay, Emmet county, early in July, 1904, and a female, evidently with eggs or young, was found on Big Beaver Island, Lake Michigan, a few days later. We have records of the so-called Belted Piping Plover (supported by specimens) from Ottawa county, April 23 and 24, 1897, and April 25, 1896, and there are records for the Indiana shore of Lake Michigan, and for the Illinois and Wisconsin shores of the same lake. We have also a typical specimen taken at Port Sanilac on the Huron shore, April 15, 1897, by W. A. Oldfield. According to Nelson "It is a very common summer resident along the lake shore [of Lake Michigan in Illinois], breeding on the flat pebbly beach between the sand dunes and shore. Arrives the middle of April and proceeds at once to breeding. Some thirty pairs were breeding along the beach at this place (Waukegan) April

24, 1876, within a space of two miles, and I afterwards found the birds as numerous at several points along the shore. Every effort was made to discover their nests, without success. The first of July the year previous, Dr. Velie obtained young but a very few days old at this same locality, showing that there is a considerable variation in the time of breeding" (Bull. Essex Inst. VIII, 1876, 123).

Our notes are too meager to give much idea of its times of departure, but a specimen in the College Museum taken near Forestville, Sanilac county, Nov. 24, 1903, would indicate that stragglers at least remain until ice forms.

Unlike the Ring-necked Plover this bird is seldom seen in flocks or even in squads, being usually solitary or in pairs, although little family parties of five or six are not uncommon in late summer. It is also more closely restricted to the shores of the large lakes, and we have no record of its occurrence in the interior of the state.

Its food is probably similar to that of the Ring-neck, and consists largely of the larvæ of aquatic insects, with some crustacea, spiders and worms. In Nebraska Professor Aughey found it feeding entirely on insects, a large part of which were locusts.

The nest is a mere hollow in the sand, and the eggs are three or four in number, pale buffy, rather sparingly speckled with black and purplish gray and average 1.27 by .96 inches.

Taverner and Swales found this species nesting on the north shore of Lake Erie during the first week of June, 1905, and state that the birds have the habit of making scores of decoy or false nests, which they often occupy, but in which eggs are never laid.

TECHNICAL DESCRIPTION.

Adult in summer: A black bar across the crown from eye to eye, and a collar of black on the sides of the chest and lower neck, sometimes complete on the back of neck but often interrupted by white in the middle line of the chest; a white collar encircles the neck above the black, and is continuous in front with the white throat, chin, and forehead; the entire remaining under parts pure white; upper parts from crown to tail uniform pale drab gray or smoke-gray, sometimes pale enough to be called ashy white, and interrupted only by the white collar on the nape and the accompanying black feathers behind it; tail-feathers largely white at base and tip, all except the outer pair (which are pure white) with a subterminal blackish bar or spot; a conspicuous white wing-bar, and much of the inner webs of the primaries white, their outer webs and tips dusky or black. Bill black at tip, yellow at base; legs and feet reddish yellow. Sexes almost or quite alike. Adult in winter: Similar, except that the black is replaced with gray like that of the back or a little darker. Young: Similar to winter adults, but with yellowish or white edgings on feathers of the upper parts. Length 6.25 to 7.50 inches; wing 4.50 to 4.80; culmen .45 to .50; tarsus .85 to 1.

Family 28. APHRIZIDÆ. Surf Birds and Turnstones.

Only a single Michigan representative, the Turnstone.

119. Turnstone. Arenaria interpres morinella (*Linn.*). (283a)

Synonyms: Ruddy Turnstone, Calico-back, Red-legged Plover.—Tringa morinella, Linn., 1766, Wils., 1813.—Strepsilas interpres, Illiger, 1811, and authors generally.

Figure 59.

Known by the plover-like bill, white throat, and the checkered or calico pattern, in black, white and rufous, of most of the upper parts. In full plumage the legs are red or distinctly reddish.

Distribution.—Arctic America, from the Mackenzie River eastward; southward in migration, chiefly coastwise, to Patagonia and the Falkland Islands.

Normally a bird of the sea shore this species occurs regularly, though usually in small numbers, along the shores of the Great Lakes, and probably in rare instances inland. Major Boies says: "I killed a number of these birds in the fall of 1894, on the eastern shore of Neebish Island, St. Mary's River [two specimens in College Museum]; also saw them quite plentiful on Crescent Key, on the west side. I found them quite agreeable eating as they were quite fat" (Bull. Mich. Orn. Club, I, 1897, 20). Mr. Newell A. Eddy states that he found the Turnstone common at the mouth of the Saginaw River on May 30, 1900, "where it occurred in flocks as well as singly." He took a male, which is now in his collection, and says he could easily have taken many more. According to Dr. Gibbs a specimen was taken by Mr. Corwin at Austin's Lake, Kalamazoo county, May 20, 1878. He also states that since that time others have been shot in Kalamazoo county, and it does not appear to be a very rare migrant. We have recently obtained for the college collection two specimens in nearly perfect breeding plumage taken near Forestville, Sanilac county, June 3, 1904, by Mr. Albert Hirzel.

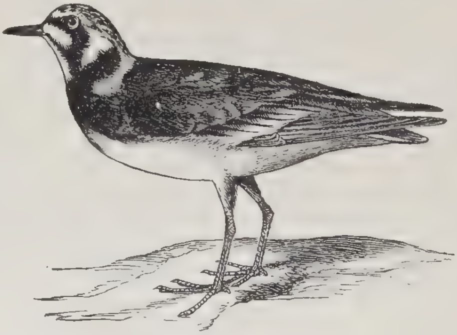

Fig. 59. Turnstone.
From Baird, Brewer and Ridgway's Water Birds of North America. (Little, Brown & Co.)

Mr. N. A. Wood, with the biological survey party, found the Turnstone rather common as a migrant along the shore of Huron county, from Aug. 20 to 27, 1908. Again in 1910, with the Mershon expedition, the species was found in small numbers on the Charity Islands, Saginaw Bay, from Aug. 6 to 24. Mr. B. H. Swales records a flock of 30 seen at Grosse Isle, Wayne county, May 29, 1910 (Auk XXVII, 1910, 452).

McIlwraith states that at Hamilton Beach, Ontario, "It is a regular visitor in spring and fall, but there are seldom more than two or three found together. Young and old are observed together in September and linger till the end of that month, when they move farther south" (Birds of Ontario, 1894, p. 168). In Kumlien and Hollister's Birds of Wisconsin (page 55) the Turnstone is said to be not uncommon as a migrant especially in spring. "Small numbers remain about Lake Koshkonong well into June, and a few, in exceptional years, remained all summer, but there was no evidence that they bred. We have seen these birds about Ontonagon, Michigan, in the latter part of July, and Green Bay late in June; still they unquestionably breed only far north of us." Butler states that "except along Lake Michigan it is almost unknown. There are but two records from the interior of the state" (Birds of Indiana, 1897, 745). In northeastern Illinois, according to Nelson, "it is a common migrant along Lake Michigan. Arrives May 15, in full breeding plumage and is found until the first week in June. Returns early in August, still in breeding plumage, which is exchanged for that of winter during the last of the month. Departs about the 20th of September. While here they are generally found in company with flocks of the smaller species of sandpipers" (Bull. Essex Inst. VIII, 1876, 123).

This is strictly a shore bird, spending its time on beaches and flats constantly wet by the waves, and probing in the sand and among the pebbles for the minute forms of animal life on which it mainly subsists. It nests at the far north, on the ground, close to the beach, where it lays from two to four light olive eggs, speckled with brown, and averaging 1.58 by 1.13 inches.

TECHNICAL DESCRIPTION.

Bill shorter than head, straight, stout, spike-like; toes without trace of connecting webs. Adult: Entire top of head, nape and hind neck, grayish white more or less streaked with brownish black; loral region, chin, and upper throat white, without streaks or spots; a black patch or streak above and in front of eye, joining another below the eye, this in turn continuous with the black of breast and sides of neck, which forms a large breast patch and almost or quite encircles the middle of the neck as a black collar; lower breast and remainder of under parts pure white; back, scapulars and wing-coverts marbled or mottled with black and rufous or chestnut, some of the feathers with whitish edges; rump and long upper tail-coverts pure white, shorter coverts black; tail-feathers with basal half and narrow tips white, the rest black; primaries brownish black, with white shafts; greater wing-coverts white-tipped; bill black; legs orange-red. Young: Similar, but with little or no chestnut or rufous above, and with much more buff and whitish. Sexes alike.

Length 9 to 9.90 inches; wing about 6; culmen .80 to .90; tarsus 1.

LIFE HISTORIES OF MICHIGAN BIRDS.—PART 2. LAND BIRDS.

Order X. GALLINÆ. Fowl-like Birds.

KEY TO FAMILIES.

A. Tarsus (shank) unfeathered. B, BB.
  B. Head naked or merely bristly; forehead with a median fleshy horn or "finger." Family 33. Meleagridæ. Turkeys.
  BB. Head mostly feathered, without fleshy horn or finger. C, CC.
    C. Large birds; wing 8 inches or more; tarsus (shank) of male always with a spur.—Family Phasianidæ. Old World Pheasants.
    CC. Small birds; wing less than 6 inches; tarsus of male without spur. Family 31. Odontophoridæ. Quail or Bobwhite.
AA. Tarsus feathered at least half way from "knee" to foot (Fig. 61). Family 32. Tetraonidæ. Grouse, Ptarmigan, etc.

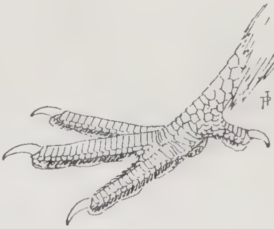

Fig. 61. Ruffed Grouse.

Family 31. ODONTOPHORIDÆ. Quail or Bobwhite.

Only a single species, the common Quail or Bob-white, is native to Michigan. Several other quails, from the Pacific states and the southwest, are found occasionally in captivity in a half-domesticated state. Those most often seen thus are the California Quail and Gambel's Quail, conspicuous for the beautiful crest of recurved feathers.

120. Quail. Colinus virginianus virginianus (*Linn.*). (289)

Synonyms: Bob-white, Virginia Partridge.—Tetrao virginianus, Linn., 1758.—Perdix virginiana, Lath., Wils., Aud., and others.—Ortyx virginiana, Jard., and many recent authors.

Figure 60.

So well known as hardly to need description, but the small size, white throat, and mottled brown, black and white plumage will readily separate it from the only birds with which it could be confounded.

Distribution.—Eastern United States and southern Ontario, from southern Maine to the South Atlantic and Gulf States; west to central South Dakota, Nebraska, Kansas, Oklahoma and eastern Texas. Breeds throughout its range.

In Michigan the Quail is abundant only in the southern half of the state, although it occurs at favorable points over the entire Lower Peninsula. The sole record for the Upper Peninsula is that by Dr. S. Kneeland, who reported it as not uncommon on Keweenaw Point, the most northern point of the state, in 1856-57. His record is as follows: "This is another of the birds that follow man in his agricultural movements. A few years since Quails were unknown in the Upper Peninsula; now they are not uncommon on the Point; as yet they have not been seen on Portage Lake. As more attention is paid to agriculture for the support of the mining population, the Quail will doubtless be common in the fields" (Proc. Bost. Soc. Nat. Hist. VI, 1859, p. 237).

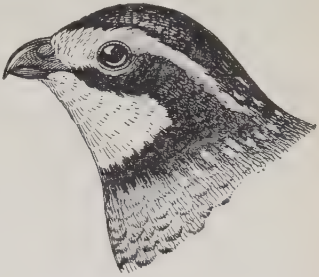

Fig. 60. Bob-white. Male. From Hoffmann's Guide. (Houghton, Mifflin & Co.)

There are records for practically every county in the Lower Peninsula, but it has been winter killed almost everywhere except in the extreme south, and even there the severe winters have more than once nearly exterminated it. Kneeland's statement as to the increase of this species with the extension of agriculture, although not verified on Keweenaw Point, seems to have ample confirmation in the Lower Peninsula, in the northern portion of which this bird apparently was unknown until after 1850. It was unknown at South Frankfort, Benzie county, until the summer of 1891, when a pair bred on the farm of Mr. W. G. Voorheis, and soon spread over the surrounding country. Mr. H. A. Danville, Jr., of Copemish, Manistee county, writes (Dec. 22, 1906): "The Quail was never seen in this county (Manistee) until about 1890. From that time until 1903 they became more numerous, but the severe winter of 1903-1904 almost destroyed them, and I have not seen one in the last three years, but a neighbor saw a flock about a mile from my place this week."

During the nesting season it is found in pairs, mostly in the open ground, and the male is a conspicuous figure as he sits on the top of a fence-post or stump and repeats his clear call of "bob-white" or "more wet" for half an hour at a time.

The nest is generally well concealed in brush or long grass, sometimes even approached by a covered arbor or tunnel through the grass, but more often exposed in at least one direction. It is deeply hollowed, well lined with fine grass, and may contain anywhere from ten to twenty-four white, unspotted eggs, which average 1.19 by .94 inches.

The female sits very close, but both birds take part in incubation and accompany the young after they are hatched. From this time on they are always found in families or "coveys" and the male is less often heard calling from the fence-posts, having plenty of other work to do. Not infrequently a second brood is reared, but in most cases this seems to be due to a failure of the first brood. However, young less than half grown are frequently seen in September, and nests with fresh eggs have been found occasionally in August and September. Ordinarily the eggs are laid from May 20 to June 10.

This is one of the famous game birds, but it is much to be regretted that some other bird cannot be substituted and the Quail be preserved for his service as an insect eater. We have few species more valuable to the farmer. It does absolutely no damage to any crop, but on the other hand consumes immense quantities of harmful insects during the warmer half of the year, and at other times gorges himself with seeds of the weeds which are among the farmer's worst foes. It seems to be particularly fond of span-worms or inch-worms, as well as of grasshoppers, and it is one of the few species which habitually eat the chinch-bug, that scourge of the wheat field from southern Michigan southward. For a full discussion of this subject the reader is referred to Dr. Sylvester Judd's paper on The Economic Value of Bob-white (Year book U. S. Dep't Agr. 1903, 193-204).

If the farmer had a little more foresight he would keep his acres well stocked with these birds, feeding them about his barns and straw-stacks during severe winters, and posting his land to prevent shooting without permission. Under such conditions he could get all the benefit to be derived from the presence of the bird during the summer, and might still give his friends good shooting in the fall, or even rent the shooting privilege under certain restrictions, as is sometimes done in other parts of the country.

TECHNICAL DESCRIPTION.

Adult male in summer: Forehead, line over and behind the eye, and entire chin and upper throat pure white, this throat patch bordered everywhere with clear black which forms a crescent on the chest and throat, the horns of the crescent formed by a stripe on each side from bill below eye; top of head mixed black and brown, the nape and back of neck similar, but sharply streaked and spotted with white; interscapulars and sides of chest pinkish brown, more or less barred with black; scapulars and tertiaries rufous or chestnut, heavily barred and spotted with black, the inner edges of tertiaries broadly margined with creamy or pure white; rump streaked with black; tail bluish ash, sprinkled with black and white; breast and belly pale cinnamon to dull white, the chest and breast with numerous v-shaped or brace-shaped black spots and bars; sides of breast and flanks rufous or chestnut, more or less streaked with black and white. Female: Similar, but the white head and throat markings replaced by clear buff. In autumn and winter both sexes show less pure black and white, and more rufous and buff, the inner edges of the tertiaries being then pure buff instead of white.

Length 9.50 to 10.75 inches; wing 4.30 to 4.70; tail 2.40 to 2.90; culmen .55 to .65; tarsus 1.20 to 1.50.

Family 32. TETRAONIDÆ. Grouse, Ptarmigan, Etc.

KEY TO SPECIES.

A. Tarsus entirely feathered. B, BB.
    B. Toes also feathered. Willow Ptarmigan. No. 124.
    BB. Toes naked. C, CC.
        C. A bunch of long narrow, stiff feathers on each side of neck (Fig. 63). Prairie Chicken. No. 125.
        CC. No bunches of stiff feathers on sides of neck. D, DD.
            D. Wing less than 7 inches; outer web of primaries without white spots. Spruce Partridge. No. 121.
            DD. Wing over 8 inches; outer web of primaries with white spots. Sharp-tailed Grouse. No. 126.
AA. Lower half of tarsus bare. Ruffed Grouse and Canada Ruffed Grouse. Nos. 122, 123.

121. Spruce Partridge. Canachites canadensis canace (*Linn.*) (298c)

Synonyms: Spruce Hen, Spruce Grouse, Canadian Spruce Grouse, Canada Grouse, Spotted Grouse, Fool Hen.—Tetrao canace, Linn., 1766.—Tetrao canadensis, of many authors.—Canace canadensis, Reich., 1851.—Canace canadensis var. canadensis, B. B. & R., 1875.

The black chin and black tail tipped with buff are characteristic marks of the adult male. The female is mottled black and white below, black finely barred with buff above.

Distribution.—Northern Minnesota and Michigan, northern New York, northern New England, New Brunswick and the Canadian zone of southern and eastern Canada.

This was once a common bird throughout the pine regions of Michigan, but even in those areas was restricted almost entirely to the spruce and cedar swamps. It was formerly abundant throughout the Upper Peninsula and in all the high lands about the sources of the Manistee, Muskegon, and AuSable rivers, and is still found sparingly in these places. Just how far southward it ever extended is difficult to say. There is a mounted specimen in the collection of the Agricultural College, labeled "North Michigan," but under the corresponding number in the museum catalogue the entry reads: "Lansing, 1874." As the original name has been erased and the name of the Spruce Partridge written over it, there is good reason to suppose that the numbers on two specimens have been transposed. Nevertheless, as the porcupine was formerly common about Lansing, and the northern hare abundant in the same county, it is not impossible that the Spruce Grouse also occurred. The most southern point in the state at which it now occurs, so far as can be learned, is Roscommon county, where a few may still be found in the deeper swamps.

Captain Bendire states that "at times during the winter, it is partially migratory; probably due more to lack of suitable food than to cold" (Life Histories, I, p. 51). In most cases it breeds wherever it is found. In 1894, Major Boies found a few on Neebish Island, and was told that it was abundant on the mainland on both sides of the St. Mary's River (Bull. Mich. Orn. Club, I, 1897, 20). Mr. O. B. Warren states that it was formerly abundant in Marquette county, but in 1898 had become uncommon owing to the changed conditions. He predicts its speedy extermination unless better protected. In 1905, F. H. Chapin reported it as common in spruce timber in Mackinac, Alger, and Luce counties, all in the Upper Peninsula, and in Emmet county (Lower Peninsula) as well. Mr. Ed. Van Winkle states that it was common in Delta county fifteen years ago but is now growing rare, while Mr. Thomas B. Wyman, of Negaunee, says that in suitable places in Marquette, Alger and Luce counties it is still common (Dec. 1905) in spruce thickets, frequenting lower and moister lands than the Ruffed Grouse. Mr. W. M. Wolfe reports seeing a single female near Beulah, Benzie county, in the summer of 1906.

The accounts of different observers vary widely as to the habits of the bird. As a rule, it is said to be far from wary, in many cases almost stupidly tame; but of late years it seems to have learned something from persecution, for some observers call it more timid than the Ruffed Grouse in the same regions.

It nests on the ground and lays from eight to fifteen buffy eggs, speckled and spotted with deep brown, and averaging 1.71 by 1.22 inches.

The flesh of the Spruce Partridge is said to be much inferior to that of the Ruffed Grouse, and always bitter in winter, presumably from the spruce and tamarack buds which form a large part of its food. It is likely, however, that during a large part of the year it feeds on seeds, berries, leaves, insects, and buds other than those of the spruce and tamarack, and that its flesh at such times is well flavored.

TECHNICAL DESCRIPTION.

Tail-feathers sixteen. Adult male: Forehead black with a small white spot on either side; bare skin above the eye bright red; rest of head and back of neck ashy gray, barred with black; back, scapulars and wing-coverts similar, but the general tone brownish gray; tail black rather broadly tipped with light rusty; chin and upper throat mainly black, bordered more or less completely by a circle or necklace of white spots; lower neck and breast black, most of the feathers with broad white tips, but a solid black patch of some size on the chest, and another on the middle of the lower breast; sides and flanks mixed gray, brown and black, with long white shaft streaks on many feathers. Female entirely different: Upper parts closely barred with pale rusty and black, many feathers with narrow white tips; tail similarly barred with black and rufous, with a broad terminal band of rusty; under parts buff or white, sharply barred with black, buff predominating on the chest and black and white on the belly.

Length 14.70 to 16.20 inches; wing 6.50 to 7.35; tail 5 to 5.75.

122. Ruffed Grouse. Bonasa umbellus umbellus (*Linn.*). (300)

Synonyms: Partridge, Pheasant, Grouse.—Tetrao umbellus, Linn., 1766, Wils., Aud., Bonap., Nutt.—Bonasa umbellus, Steph., Baird, Elliot and others.

Figures 61 and 62.

The tuft of broad, square-tipped black feathers on either side of the neck, and the long fan-like, gray-tipped tail, with its broad sub-terminal band of black or dark brown, are characteristic of both sexes; the neck ruffs of the male, however, are larger and glossy, while those of the female are browner or duller and without gloss.

Distribution.—Eastern United States, and southern Canada, west to Minnesota, south in the mountains to Northern Georgia, Mississippi, and Kansas.

The Ruffed Grouse, or common Partridge, is generally distributed over the entire state, although it becomes yearly less common in the cultivated districts. The bird is naturally unsuspicious and far from wild, but constant persecution has rendered it very timid throughout most of the state. In the wilder portions of the Lower Peninsula, and in much of the Upper Peninsula, it still retains much of its unsuspicious nature, and when flushed, either by man or dog, it goes but a short distance and often, if not usually, alights in a tree, where it sits in full sight apparently quite unconcerned.

Its food consists largely of buds and leaves, and it is particularly fond of the buds of hazel, birch, poplar, and apple, and instances are known where apple trees standing close to the woods have been nearly stripped of their buds during the winter. While the ground is bare of snow the bird feeds largely on berries and seeds, and eats insects freely when they are obtainable. Dr. A. K. Fisher, of the United States Department of Agriculture, states that Ruffed Grouse are very fond of grasshoppers and crickets, and that it is rare to find a stomach or crop that does not contain their remains during seasons when these insects are plentiful. He also states that "beech nuts, chestnuts, and acorns of the chestnut oak and white oak are common articles of food. In the fall the foliage of plants often forms a large part of their food, those of clover, strawberry, buttercup, wintergreen, and partridge-berry predominating" (Bendire, Life Histories of North American Birds, Vol. I, p. 63).

Ordinarily the Partridge roosts in trees, the covey separating somewhat so that not more than two or three birds roost in any one tree. They commonly select dense evergreens and perch in the thickest parts where they are well screened. In severe weather, after a considerable depth of snow has accumulated, they frequently plunge into the snow toward night and pass the entire night completely below the surface. It is commonly believed that many are killed each winter through this habit, the snow freezing at the surface during the night. forming a crust so hard that the bird is unable to break through in the morning; but while this may happen occasionally it is not likely that many birds are thus killed. One remarkable thing in connection with the life of this bird is the fact that during the winter the toes become fringed with a growth of horny scales or plates which serve to support it while walking on the snow. These are shed again in the spring, being molted precisely like the feathers (See Fig. 62).

The drumming of the Ruffed Grouse is one of the remarkable sounds of the woods, and although most commonly heard during the mating season, is continued with little interruption until snow falls, and is resumed again in earliest spring. The sound is produced by the male bird beating the air with its wings, and some observers believe that he strikes the wings together over the back, others that most of the sound is produced by the blows of the wings upon the bird's sides, while still others think that a hollow log is necessary for the production of the resonant tones. It seems probable, however, that the blows of the wings upon the air alone are sufficient to produce the sound, and the performance is believed to be the call or invitation of the male bird to the female.

The nest is placed on the ground, often, but by no means always, at the foot of a tree or beside a log. It is merely a hollow lined with dry leaves, and the sitting bird is usually in plain sight except for the protective coloration which her own plumage affords. The eggs vary in number from eight to twelve, occasionally more, but more than fourteen is an unusual number. Captain Bendire states that he has one reliable record of a nest with twenty-three eggs, but that the average is about eleven. The eggs are nearly white, varying from pure white to buffy, and are often entirely unspotted, although others are more or less sprinkled with fine dots of reddish brown which are rarely large enough to be called spots. The eggs average 1.58 by 1.19 inches.

The young run as soon as hatched and when suddenly alarmed are very skilful in hiding. At such times the old bird almost always feigns lameness or injury in order to draw the enemy away, but if this fails she has been known to fly boldly at a man or dog, sometimes even driving the latter away. The male is said to forsake the female as soon as the eggs are laid and apparently takes no part in caring for the young, but when these are well grown the males join the coveys and remain with them until the following spring.

TECHNICAL DESCRIPTION.

Tail-feathers eighteen; feathers of crown somewhat elongated, forming a small crest; neck with a dark ruff formed by a tuft of broad black or brownish black feathers on either side. **Adult male:** Top of head with many narrow cross-bars of black, rusty brown and sometimes white; rest of upper parts mottled rusty-brown and whitish, the scapulars, interscapulars, inner secondaries and wing-coverts usually edged or tipped with buffy white and often with large spots of black; each feather of lower back, rump and upper tail-coverts with a lance-shaped or heart-shaped shaft spot of grayish white; neck ruffs clear sooty black, with greenish or purplish metallic gloss at the tip; tail rusty brown to clear gray, crossed at regular distances by 6 to 9 narrow black bars, followed by a broad sub-terminal black or brownish black band, and tipped by speckled gray or grayish white. Chin and upper throat clear buff, the lower feathers more or less tipped with dusky; remainder of under parts white, grayish white, or buffy white with numerous cross-bars of deep buff, brown or black, these bars strongest and darkest on sides and flanks, often obscure on breast and belly. Female: Similar, but somewhat smaller; the ruff smaller, duller and more brownish, the dark bars below less distinct. Iris hazel, bill dark brown, feet dark horn-color.

Length 15.50 to 19 inches; wing 7 to 7.50; tail 5.50 to 7.

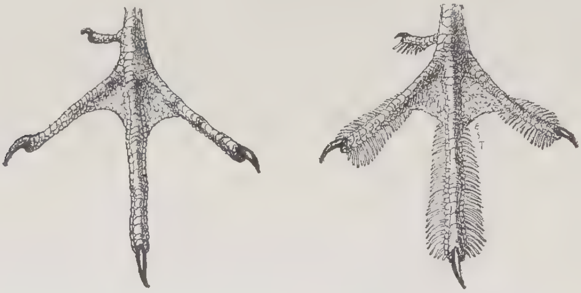

Fig. 62. Foot of Ruffed Grouse, in summer and in winter (at right).

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123. Canada Ruffed Grouse. Bonasa umbellus togata (*Linn.*). (300a)

Synonyms: Northern Ruffed Grouse, Canadian Ruffed Grouse, Spruce-woods Ruffled Grouse (not Spruce Grouse).—Tetrao togatus, Linn., 1766.

Separable from the common Ruffed Grouse by its somewhat larger size, decidedly grayer upper parts and tail, and the heavier, more distinct dark bars of the under parts. It also as a rule shows more black on the upper surface and a decided absence of rufous on the same areas; typical examples, however, can scarcely be named without comparison, even by experts.

Distribution.—The spruce forests of northern New England, northern New York, and the British Provinces, west to Oregon, Washington and British Columbia, north to James Bay.

The occurrence of this subspecies in Michigan has been a matter of doubt ever since its description by Ridgway in 1885. Various writers have stated more or less positively that it was found in the colder parts of the state, but in most cases specimens have not been examined by competent authorities. Even now we do not feel sure that typical *togata* is found anywhere in the state, although it seems highly probable that birds from the spruce forests of the eastern part of the Upper Peninsula may prove to belong to this race.

It is included in Mr. Wood's list of birds observed in the Porcupine Mountains, Ontonagon county (Ecology of Northern Michigan. 1906, p. 114), and Mr. Wood writes me that the specimens collected by the party at that time (summer of 1904) were identified as *togata* by

Mr. H. C. Oberholser, of Washington. He is also positive that other specimens in the University of Michigan Museum, viz., one from Delta county, two from Iosco county, and one from Houghton county, belong to the same subspecies. Mr. Frothingham also records this subspecies from the Michigan Forest Reserve in Roscommon county, where, however, he believes that both forms are found. On the other hand, Mr. William Brewster, who has examined most of the specimens in the Agricultural College collection, states that a specimen from Kalamazoo county and another from Ionia county are typical *umbellus*, and that, as he has equally good representatives of this form from Cadillac, Wexford county (the highest ground in the Lower Peninsula), and from Oden, Emmet county (the northernmost county in the Lower Peninsula), he should "infer that all the grouse of the Lower Peninsula are likely to be *umbellus*." He writes further "if I were forced to name your other three skins, from the Upper Peninsula, I should call them *togata*, but two of them are females (it is always more difficult to determine birds of this sex), and the third is certainly not a typical *togata*. To that form the Chippewa county female affords a rather nearer approach than does the other female (from Marquette county). I should not care to definitely refer these three birds to *togata*, but I am inclined to think they are nearer to that subspecies than to *umbellus*" (Letter, March 18, 1907.) The Chippewa county specimen referred to was taken near Eckerman by Hon. Chase S. Osborn, October 26, 1906, and a second specimen, also a female, almost identical in plumage, was taken at the same time and sent to me, but was so badly mangled that I did not send the fragmentary skin to Mr. Brewster. At my request Mr. (now Governor) Osborn, who collected these specimens, examined and reported upon all the partridges killed by his party at Deerfoot Lodge, near Eckerman, in November and December 1906. He writes that out of 81 partridges taken by himself and his friends the proportion of gray-tailed birds to brown-tailed birds was about four to one, or possibly greater. Several red-tailed ones were noted. Of course the gray tail is by no means confined to *togata*, yet no distinctly rufous-tailed bird can be considered typical *togata*.

As at present understood the Canadian Ruffed Grouse is a bird of the spruce swamps of the northernmost portions of the eastern United States, but it unquestionably intergrades with the typical *umbellus* so as to form a complete series of almost imperceptible gradations. Until we have numerous specimens from all parts of the Upper Peninsula, as well as from the northeastern counties of the Lower Peninsula, I do not feel safe in attempting to outline the distribution of the typical Canadian form in Michigan. However, it would seem perfectly safe to say that specimens of typical *umbellus* can be found anywhere in the Lower Peninsula and almost anywhere in the Upper Peninsula, while specimens of typical *togata* will hardly be found in the Lower Peninsula and certainly not south of the Saginaw-Grand Valley.

It would seem that the Ruffed Grouse of Wisconsin are in very similar case. Mr. Brewster states that "although the Wisconsin and Michigan grouse that he has examined are darker and grayer than those from New England, they appear to be nearer *umbellus* than to true *togata*, which almost invariably has the entire throat barred transversely with dusky markings, a feature not found in our birds" (Kumlien and Hollister, Birds of Wisconsin. p. 56).

The condition in Minnesota seems to be similar. Dr. Thomas S. Roberts, of Minneapolis, has sent us an analysis of nine specimens of *Bonasa* from various parts of the state, which he sums up as follows: "The confusion is extreme, and if there is any object whatever in recognizing the two 'varieties' the only conclusion which can be arrived at for Minnesota is that this region is on the borderland between the two forms, with no distinctly differentiated individuals, but with the *togata* element preponderating throughout the state, reaching, as might be supposed, its most marked development toward the Canadian boundary. It is probably true, as no little evidence goes to show, that individuals of the same brood show wide variation, including, indications of both varieties. I cannot see that any good purpose is subserved by recognizing these different color phases" (Letter, June 5, 1909).

So far as we can learn the two forms of Ruffed Grouse in question do not differ materially in habits, although the fact that the Canadian Ruffed Grouse is partial to spruce swamps will doubtless be found to imply somewhat different food from that of the more southern bird.*

TECHNICAL DESCRIPTION.

Similar to the ordinary Ruffed Grouse, but "Darker, with brown markings on lower parts very conspicuous, everywhere exposed, and bordered by very distinct dusky bars; bars on flanks very dark brown, or brownish black. Upper parts with more or less of gray, often mostly grayish, the tail usually gray (sometimes tinged with ochraceous)" (Ridgway)

124. Willow Ptarmigan. Lagopus lagopus lagopus (*Linn.*). (301)

Synonyms: Ptarmigan, Common Ptarmigan, Willow Grouse, White Grouse, Snow Grouse.—Tetrao lagopus, Linn., 1758.—Lagopus albus, Aud., 1839, and authors generally.

Known in any plumage by the white outer half of wing (primaries and secondaries); in winter the whole plumage pure white except the tail, which is black.

Distribution.—Arctic regions; in America south to Sitka and the British Provinces. Breeding range restricted to the arctic and sub-arctic regions, mainly north of 55° north latitude. Accidental in New England.

Although we do not know of a Michigan specimen of this bird in any collection, I am satisfied that it formerly occurred regularly in winter on Keweenaw Point, and probably at other Michigan points on the south shore of Lake Superior. According to Dr. Gibbs, Henry Schoolcraft, in a lecture delivered in 1834, mentions this species as taken at Sault Ste. Marie. Stockwell also states that it "is found in limited numbers upon the mountains of the Upper Peninsula" (Forest and Stream, VIII, 241). Both Dr. Gibbs and A. B. Covert state that Rev. E. H. Day, whom they knew at Cadillac, Michigan, but who formerly lived as a missionary among the Indians on Keweenaw Point, informed them that these "Snow Grouse" or Ptarmigan frequently appeared in large numbers during severe weather and were often killed and used as food. Mr. Covert states that he has talked with lumbermen, hunters, and others who had no special ornithological knowledge, but who vouched for its occurrence around lumber camps in the Upper Peninsula in winter, giving accurate descriptions. They described it as very tame, sometimes fed by the cooks around the doors

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*The Gray Ruffed Grouse, (*B. u. umbelloides*) has been attributed to Michigan once or twice by sportsmen and writers on popular natural history, but we have no reason to believe that this western subspecies is ever found here. In all probability gray-tailed birds intermediate between *umbellus* and *togata* have given rise to these reports. True *umbelloides* is confined to the Rocky Mountain region and probably does not range east of Manitoba.

of their shanties. One woman whose husband was the superintendent of a lumber camp described it as "a large white dove with legs like those of a Brahma chicken."

McIlwraith states that "C. J. Bampton, Registrar of the District of Algoma, mentions the Willow Ptarmigan as a rare winter visitor at Sault Ste. Marie. Their southern migrations depend to some extent on the peculiarities of the season, but usually they are common winter visitors throughout Manitoba and the northwest" (Birds of Ontario, 1894, 176). In Kumlien and Hollister's "Birds of Wisconsin," page 57, we read: "Exceedingly rare straggler from the north. Two specimens captured in a trap at Racine in December, 1846, by Dr. P. R. Hoy. It is certain that the Ptarmigan occurs as a rare winter visitor in the Northern Peninsula of Michigan, and formerly at least reached Wisconsin during the severest weather." Dr. S. Kneeland says: "White Ptarmigan, *Lagopus mutus*? Leach. There is a White Grouse in this region, but whether it is the *L. mutus*, *albus*, or *leucurus*, I cannot positively say" (Birds of Keweenaw Point, Lake Superior, Proc. Bost. Soc. Nat. Hist., VI, 1859, 237).

In view of the above facts it seems perfectly clear that the Willow Ptarmigan formerly appeared, at least occasionally, at several of the northernmost points in the state. Its natural habitat is far to the north, but during the winter it collects in large "packs" and moves southward, often several hundred miles, and doubtless under certain conditions these migrations are extended so far that some individuals enter our territory.

According to L. M. Turner, it is abundant in the Anderson River region of Arctic America, where it nests on the ground, laying, early in June, from 7 to 11 eggs, which are cream-color to buff, heavily and thickly marked with brown. The period of incubation is about 17 days. According to Bendire its principal food is buds and leaves of birch and willow, together with berries and insects.

TECHNICAL DESCRIPTION.

Adult in winter: Plumage entirely snow white except the tail and usually the shafts of the outer primaries, which are black. All the tail-feathers are deep black, narrowly tipped with pure white, and the white upper tail-coverts completely conceal the black when the tail is closed. Bill black; iris brown; tarsi and toes heavily covered with fine hair-like feathers; even the nails white in midwinter. In summer plumage [never seen in Michigan] the male has the upper parts barred with brown and black; the head, neck, and most of lower parts deep cinnamon-rufous, uniform on throat, fore-neck and chest, barred with black on sides, flanks and under tail-coverts; primaries and outermost wing-coverts white. The female in summer has the primaries and outer wing-coverts white as in the male, but lacks the deep cinnamon-rufous of head, neck and lower parts, being coarsely and irregularly barred and spotted with buff and black above, and with black and buffy white below (Ridgway).

Length 14 to 17 inches; wing 7 to 7.50; tail about 5.

125. Prairie Chicken. Tympanuchus americanus americanus (*Reich.*). (305)

Synonyms: Prairie Hen, Pinnated Grouse.—Cupidonia americana, Reich., 1852.—Cupidonia cupido, Baird, 1858.—Cupidonia cupido var. cupido, B. B. & R., 1875.

Plate XIV and Figure 63.

A much heavier bird than the Ruffed Grouse, with much shorter tail (only four inches), and with a tuft of about sixteen long, narrow feathers on each side of the neck overlying a patch of bare, red or yellow skin. It resembles the Sharp-tailed Grouse in a general way, but the latter lacks the neck tufts, has the middle tail-feathers decidedly longer than the rest (about an inch), and the breast spotted with V-shaped black marks instead of barred regularly with black and white.

Distribution.—Prairies of the Mississippi Valley; south to Louisiana and Texas, east to Kentucky, Indiana, Ohio, Michigan, and Ontario; west through eastern portions of North Dakota, South Dakota, Nebraska, Kansas, and Indian Territory; north to Manitoba; general tendency to extension of range westward and contraction eastward; migration north and south in Minnesota, Iowa, and Missouri.

Formerly the Prairie Chicken seems to have been abundant over a large part of the southern half of the state, and if it were afforded good protection from the so-called sportsmen during the fall no doubt it would still be a common bird. It is well known that this species is not necessarily driven out by civilization, in fact up to a certain point it increases in numbers with the cultivation of the country. It prefers prairie lands and ordinarily nests in such ground, and of course when all suitable nesting places are destroyed by plowing the bird cannot be expected to remain. However, there are large tracts of undrained or poorly drained open country in southern Michigan in which the Prairie Chickens have nested in considerable numbers until within a very few years, and doubtless in most counties south of the Saginaw Valley at least a few pairs linger yet.

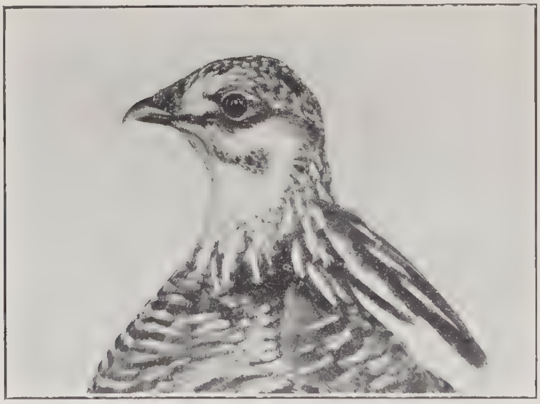

Fig. 63. Prairie Chicken.
From photograph of mounted specimen. (Original.)

The species was common in Ingham county, near the college, until 1898 or 1899, but apparently none have nested in the old haunts since 1900. I am informed, however, that there are still (1911) some in the southeastern part of the county. Mr. John Hazelwood, of Port Huron, writes: "I saw a flock of thirteen, at four different times, quite close to Capac, St. Clair county, in 1899." In 1876 they were abundant in parts of Washtenaw county, and a few were still found about Brighton in 1886. Then apparently they became extinct there for many years, but reappeared in 1908 and now seem to be on the increase in Washtenaw county (N. A. Wood, Auk, XXVII, 1910, 131). Some are still found in southern Jackson county (Watkins, 1906), and Hon. Chas. H. Chapman, then State Game and Fish Warden, sent me reports from one of his deputies who had found Prairie Chickens in some numbers in parts of Eaton and Calhoun counties in November, 1906. We also have recent reports of their presence in some numbers at several different places in Kalamazoo county. A nest of twelve eggs was taken in Kalamazoo county June 5, 1892 (Westnedge). At Petersburg, Monroe county, Jerome

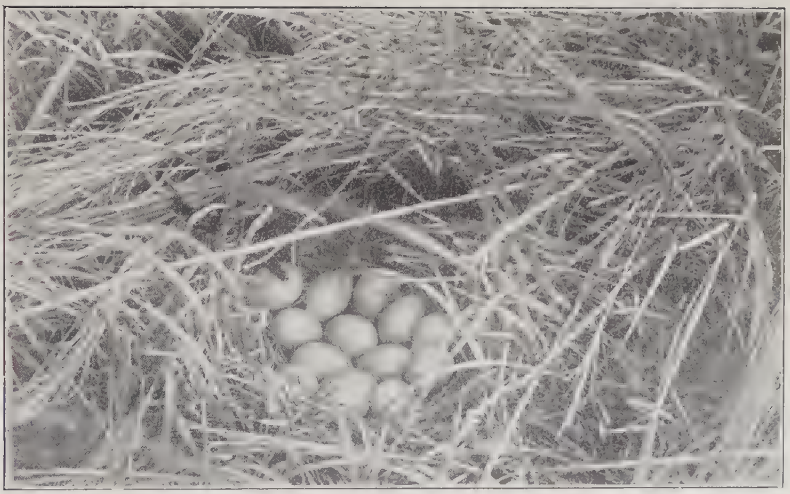

Plate XIV. Nest and Eggs of Prairie Chicken.
From photograph by Thomas L. Hankinson. (Original.)

Trombley stated that it was nearly or quite extinct in 1906. Probably it exists in greatest numbers at the present time in those counties of the three southern tiers, in which the swales and undrained marshes of the original prairie region have been best protected from fire. Frequent fires and the incessant persecution of gunners have completed the extermination in scores of places where the bird was once abundant.

The call of the male during the mating season is one of the most remarkable among bird notes. It is variously known as "booming," "crowing" and "tooting," but no one of these terms gives any fair idea of the notes, which combine the sweetness and clearness of a bell with the resonance of a drum. Probably they could be most closely imitated with a pure-toned cornet, at least this is the case with those we have heard here in Ingham county. But other observers describe the sounds as quite different. Thus Judge Caton speaks of "the proud cock* * * * pouring out a booming noise, almost a hoarse roar, only more subdued, which may be heard for at least two miles in the still morning. This heavy booming sound is by no means harsh or unpleasant; on the contrary it is soft and even harmonious. If heavier than the deep key notes of a large organ, it is much softer, though vastly more powerful." Doubtless the distance at which the bird is heard has much to do with the impression produced, and we have found it extremely difficult to locate the bird by the sound, so much so that the power of ventriloquism often ascribed to this species seems to be quite warranted. When "booming" the male inflates the naked air sacs on the sides of the neck, until they look, as Judge Caton says, "like two ripe oranges."

So far as we can learn no southward migration of this species in the late fall or winter has ever been noticed in this state, although it is a well known fact that such a migration occurred formerly with great regularity in Minnesota, Iowa, Missouri and Nebraska, and to a lesser extent in Wisconsin and Illinois. During these migrations flocks of several hundred individuals, sometimes a thousand or more, have been noted, but they were always wild and difficult of approach, and when alarmed made flights of several miles without pausing. In Iowa at least it has been shown that these migrating birds are chiefly, if not entirely, females, the males remaining all winter at the north (Cooke, Bird Migration in the Mississippi Valley, 1888, 105).

The Prairie Chicken nests invariably on the ground and lays from ten to fifteen eggs which vary from "pale cream to vinaceous and olive-buff, as well as light brown and clay color, usually faintly but regularly spotted with fine pin-points of reddish brown" (Bendire, Life Histories, Vol. I, p. 92). The eggs are generally laid early in May, but have been found occasionally in July and August. Normally but one brood is reared in a season, and the period of incubation is said to be from three to four weeks. Our illustration (Plate XIV) is from a nest of fourteen eggs found at Chandler's Marsh, Ingham county, May 31, 1897, by L. J. Cole. The eggs average 1.66 by 1.24 inches.

Its food consists very largely of insects so long as these are obtainable, and not infrequently grasshoppers form almost the sole food for weeks at a time. Various grains and seeds are also eaten freely, and during the colder half of the year, buds, berries and leaves are freely taken. Since the bird never injures grain crops in any way, and destroys myriads of harmful insects, its preservation and increase would seem to commend themselves to the farmer, who should encourage their presence whenever possible, especially by feeding with grain in severe winter weather, and by coöperating with the sportsman and game warden in enforcing the law.

TECHNICAL DESCRIPTION.

Tail of eighteen feathers, tarsus feathered to base of toes; side of neck with a tuft of narrow, elongate feathers, largely black, but more or less striped or margined with buff. Upper parts barred and checkered with black, buff and gray, the top of head showing most black and the feathers of crown somewhat elongated to form a crest; chin, upper throat and most of sides of head buffy white; a brown stripe from bill below eye, and a conspicuous dark patch half an inch lower; under parts from throat to tail regularly barred with brown or black and buff or buffy white, the buff deepest on lower neck and chest, the dark bars blackest on sides and flanks; tail-feathers brownish black, narrowly tipped with pure white, and barred with buff in the female, but without bars in the male (except sometimes on middle pair). The female also has the neck tufts much shorter than the male, and is somewhat smaller throughout, but otherwise there is little difference between the sexes.

Length of male 18 to 19 inches; wing 8.60 to 9.40; tail 4 to 4.30. Length of female 17.50; wing 8.60 to 8.75; tail 3.60 to 4.

126. Sharp-tailed Grouse. Pediœcetes phasianellus phasianellus (*Linn.*). (308)

Synonyms: Spike-tail, Pin-tail, Prairie Chicken, Blackfoot, Northern Sharp-tailed Grouse.—Tetrao phasianellus, Linn., 1758, Forst., 1772, Gmel., Lath, and others.—Pediœcetes kennicotti, Suckley, 1861.—Ped. phasianellus var. phasianellus, B. B. & R., 1875.

Scarcely to be confounded with any other grouse except the true Prairie Chicken, from which it differs as noted under that species.

Distribution.—Central Alaska and northwestern British Columbia east through central Keewatin to central western Ungava, and south to Lake Superior and the Parry Sound district Ontario; casual east to Saguenay River, Quebec. (A. O. U. Check-list, 1910.)

Considerable uncertainty has existed with regard to the occurrence of this species within our limits, but the question has been set at rest by the recent expeditions (1904, 1905) from the University of Michigan to Isle Royale* in Lake Superior, where this bird was found to be resident and breeding in some numbers. According to Mr. Norman A. Wood, who was in charge of the party which visited Isle Royale in the summer of 1904, "A family of this species was seen at close range by Mr. Ruthven, near Siskowit Bay, Isle Royale, August 29, 1904. The residents told me that the 'Prairie Chicken' lived at Siskowit Bay throughout the year. The large clearing (about 500 acres) about the old mines seems to furnish the favorable conditions for them."

Three specimens taken on Isle Royale in the summer of 1905 were submitted to the Division of Biological Survey of the U. S. Department of Agriculture at Washington, and were identified by H. C. Oberholzer as the typical northern form Pediœcetes phasianellus phasianellus. This of course is just what would be expected, since Isle Royale lies only eighteen miles from the north shore of Lake Superior. Mr. Peet, who accompanied the 1905 expedition, made the following notes on this species: Found at Rock Harbor and Siskowit Bay by our party and was reported at Washington Harbor by the residents, who called it a pheasant. On July 25 a female accompanied by three young, about half grown, was found in a clearing on a small rock ridge near Benson Brook. Mr. Kneutson, of Park Place, reported July 20, that the Grouse nested regularly at his clearing and that several broods of young had recently been seen there. He also said that during the previous fall he had found them very plentiful and tame at the clearing at McCargoe Cove. The Malone boys at Menagerie Light House reported these birds to be quite common breeders at the clearing when the old town stood near the head of Siskowit Bay (Max M. Peet, Adams' Rep. Mich. Geol. Surv. 1908, p. 347).

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*Isle Royale belongs to Keweenaw county, Michigan.

It is worthy of remark that both A. B. Covert and Dr. Morris Gibbs long ago stated their belief that this species occurred, at least as a winter visitor, in parts of the Upper Peninsula. Dr. Gibbs has the following statement in his notes written many years ago: "The Rev. E. H. Day, pastor of the M. E. church at Cadillac, informs Mr. A. B. Covert and me that this species is not rare in the Northern Peninsula. He lived on the meat of this bird some time while an Indian missionary a good many years ago [probably on Keweenaw Point]." In Forest and Stream (Vol. VIII, 241) G. A. Stockwell says, alluding to this species, "An occasional visitor to Lower Michigan; more frequent in the Upper Peninsula; variety *columbianus* is confined to the eastern shore of Lake Michigan and is extremely rare." The latter part of Stockwell's statement remains unexplained. So far as can be learned no specimen of the Columbian Sharp-tailed Grouse has ever been taken in any part of Michigan. It is possible that the ordinary prairie form of the Sharp-tail (P. phas. campestris) may have occurred at one time over a part of the Lower Peninsula, but that, as this bird, unlike the Prairie Chicken, retires rapidly before civilization, it has now become extinct. McIlwraith (Birds of Ontario, 1894, 180) says: "The Sharp-tail is abundant near Winnipeg, from which point it has reached the Hamilton market. It is also reported by Mr. Bampton as being found at Sault Ste. Marie (Canada)." Doubtless reference is made here to the northern form, the same found on Isle Royale.

In habits the Sharp-tail is not very unlike the Prairie Chicken, but it is less often found in entirely open ground, preferring the edges of the forest and particularly the brush slopes of an uneven country. The nest is placed on the ground; the eggs, six to twelve, "varying from olive-buffy to deep brown, often plain, but usually more or less speckled with dark brown, and averaging 1.70 by 1.23 inches" (Ridgway).

TECHNICAL DESCRIPTION.

Tarsus feathered to base of toes; tail of eighteen feathers, the middle pair in the male projecting an inch or more beyond the rest; no elongated feather tufts on sides of neck. General distribution of colors much as in the Prairie Chicken, including the light buffy chin, throat and cheeks, with the dark stripe beneath the eye and the blackish patch below the cheek; under parts, however, whitish or very pale buffy, with numerous v-shaped dusky spots on breast, sides and flanks, but no distinct bars except on a narrow belt at base of neck, and sometimes on the flanks; lower breast and belly mostly pure white and unspotted; upper parts mottled black, buff and white, the wing-coverts with numerous large round or oval white spots, and the scapulars usually with sharp white shaft-streaks; tail-feathers mostly whitish, only the two middle pairs mottled and barred with black, rusty and white. Female similar, but smaller, the middle tail-feathers much shorter.

The above description will answer equally well for the typical Sharp-tailed Grouse (*P. p. phasianellus*) of the interior of British America, and the Prairie Sharp-tail (*P. p. campestris*) of the plains of the United States. The latter, according to Ridgway, is light-colored, "the general tone of the upper parts buffy, and grayish or light brownish of various shades always predominating over black markings, the white markings on scapulars and wings not conspicuously contrasted with the general color." On the other hand, the northern form *P. p. phasianellus*, "is very dark colored, with black or dusky largely predominating on upper parts, the white scapular streaks and wing spots showing in strong relief."

Family 33. MELEAGRIDÆ. Turkeys.

Only a single Michigan species, the Wild Turkey, formerly abundant in the southern half of the state, now exterminated.

127. Wild Turkey. Meleagris gallopavo silvestris, *Vieill.* (310a)

Synonyms: American Turkey, Eastern Turkey, Northern Turkey.—Meleagris gallopavo, Linn., 1758, and most of the older American writers.—Meleagris americana, Bartram, 1791.—Meleagris silvestris, Vieill., 1817.—Gallopavo sylvestris, Catesby, 1730, Leconte, 1857.—Meleagris fera, Vieill., 1824.

So similar to the domesticated turkey that no description is needed, yet a single tail-feather will show from which bird it was taken. In the domesticated turkey the rump feathers as well as the tail-feathers are always tipped with white; in the Wild Turkey these feathers are tipped invariably with rich chestnut brown.

Distribution.—United States from Chesapeake Bay to the Gulf coast, and west to the Plains, along wooded river valleys; formerly north to southern Maine, southern Ontario, and up the Missouri River to North Dakota.

Formerly an abundant bird at least as far north as the Saginaw Valley, there is every reason to believe that at present the species is extinct in Michigan. Up to 1875 it was fairly common over a large part of the state, but during the next five years it decreased with extraordinary rapidity, and before 1890 had become so uncommon as to be considered a very rare bird almost everywhere. Mr. W. B. Mershon, of Saginaw, in a letter dated July 18, 1905, says: "The last one I killed, as near as I can figure, was about 18 years ago. It was at a point about three miles south and west of Reece (in Saginaw Co.?), and weighed 23½ pounds, the most magnificent specimen of a turkey gobbler I have ever seen. I have it nicely mounted and in my collection at my office. There were five in the bunch. For a few years after this I heard of turkeys still being in the dense swamp around Akron, Tuscola county. This is a point just beyond Fairgrove, on the S. T. & H., and I have no doubt they did exist in that locality longer than in any part of Michigan, but I do not believe there has been a genuine Wild Turkey left in Michigan in the last six or seven years."

From an article by Mr. F. S. Shuver, we quote the following: "Quite common in Van Buren county until 1880. A few have continued to breed in Arlington township, and 14 or 15 were shot in the winter of 1893-94. Several more were killed in the winter of 1895-96, and a few were seen during the winter of 1896-97. A gobbler shot in January, 1897, was the last one I have heard of" (Bull. Mich. Orn. Club, Apr. 1898). Mr. Covert furnishes a record of a male killed in Tuscola county, October 12, 1874, and a female near Ann Arbor, November 19, 1876. In 1904 Mr. B. H. Swales stated that it was then extinct in the southeastern part of the state (Birds of S. E. Michigan). Mr. Newell A. Eddy tells me that in 1883, and for at least three years later, Wild Turkeys were sold frequently in the Bay City markets and doubtless were taken in the immediate vicinity. Mr. John Hazelwood writes that he frequently shot turkeys within a mile of the city of Port Huron "many years ago, but there is not one left in this county now" (1904). Dr. Robt. H. Wolcott states that it was numerous near Grand Rapids up to the middle eighties and reported as late as 1897 from Hudsonville and Jenisonville (MS. List, 1904). Mr. Purdy says that at Plymouth, Wayne county, he has heard of none since 1888.

We have a specimen in the Agricultural College Museum, taken in Clinton county, a few miles north of the College, in November 1871, and Dr. Atkins recorded a specimen seen at Locke, Ingham county, December 20, 1882, and again January 17, 1884. Mr. C. J. Davis, of Lansing has in his collection a fine gobbler killed near Pine Lake, Ingham county, about December 18, 1884. This bird weighed 21¼ pounds and was one of a pair killed at the same time and place. Mr. Davis believes these to be the last killed in this county. Mr. J. Foster, of Pompeii, informs me that the turkey was formerly found in some numbers in Isabella county. He has hunted in every part of the Lower Peninsula but has never heard of or seen any sign of this species north of that county. Mr. F. H. Chapin, of Kalamazoo, writes that in the winter of 1888 he followed a Wild Turkey for some distance in Cooper township, Kalamazoo county, but it escaped by flying across the river. He also states that in the fall of 1892 or 1893 he was informed by reliable parties that there was a small flock in Martin township, Allegan county, in a swamp bordering the Gunn River, and on March 6, 1892, he flushed one in a swamp near Almena, Van Buren county, and saw it disappear over the treetops. Farmers in the vicinity informed him that there was quite a large flock in the swamp.

It should be noted that in several parts of the state the domesticated turkey has run wild and is by many regarded as the true Wild Turkey. Such birds fly nearly as well as wild birds and are almost as hard to shoot. They may be readily distinguished, however, by the markings of the tail-feathers and the upper tail-coverts, which are always white-tipped in the domesticated form and chestnut in the wild bird.

The turkey nests on the ground, laying ten to eighteen eggs, which are light buff, thickly speckled or sprinkled with brown, and averaging 2.55 by 1.79 inches. We have a single egg in the College Museum, numbered 4977, and collected by William Kedzie, in Lansing township, but the date is not known.

TECHNICAL DESCRIPTION.

Adult male: Head, with its bristly bare skin, fleshy appendage, wattles, etc. red, blue and white, as in the domestic turkey; a large tuft of coarse black bristles hanging from the center of the upper breast; general plumage dark brown, with rich metallic lustre, showing burnished bronze, copper, blued steel, or gold, according to the angle at which the light strikes it; most of the feathers of the under parts, and especially those of the wing-coverts, lower back and rump, tipped with velvet black; upper tail-coverts tipped with chestnut; primaries and secondaries slate-colored, barred with white, the white bars broadest and most conspicuous on the secondaries; tail brown, narrowly barred with black, with a broad subterminal black band and tipped conspicuously with bright reddish brown or chestnut. Adult female: Similar but much smaller, duller, and browner, the metallic reflections largely wanting and no trace of the "beard" on the chest.

Length of male 48 to 50 inches; wing 21; tail 18.50; weight 16 to 40 pounds.

Family PHASIANIDÆ. Pheasants.

This is the old-world family to which belong the barnyard fowl, peacock golden and silver pheasants, and nearly a hundred other species. It is represented in Michigan only by one or two species recently introduced and as yet doubtfully established. The commonest form is the Ring-necked or Japanese Pheasant, but the closely related English Pheasant may have been liberated in a few places.

Order XI. COLUMBÆ. Pigeons and Doves.

Family 35. COLUMBIDÆ. Pigeons.

KEY TO SPECIES.

A. Larger. Tail-feathers twelve; sides of neck without black spot. Passenger Pigeon. No. 128.

AA. Smaller. Tail-feathers fourteen; a small but distinct black spot on each side of the neck. Mourning Dove. No. 129.

128. Passenger Pigeon. Ectopistes migratorius (*Linn.*). (315)

Synonyms: Wild Pigeon, Pigeon, Wood Pigeon, Red-breasted Pigeon, Blue-headed Pigeon, incorrectly Carrier Pigeon.—Columba migratoria, Linn., 1766, Gm., Forst., Wils., Aud.—Ectopistes migratoria, Swains., 1827, and authors generally.—Columba canadensis, Linn.—Columba Americana, Kalm.

Plates XV XVI, XVII.

The dove-like form and long, pointed tail will separate this species from any of our birds except the Mourning Dove, and from this it may be known at once (with the bird in hand) by its large size, the total absence of the small black spot on each side of the neck, and the possession of but twelve tail-feathers instead of fourteen. At a distance of fifty yards, however, none of these points serves, and I doubt that any one could surely discriminate the two species unless they were seen together, or some other bird whose identity was known were close at hand for comparison of size. The slate-blue head and ruddy breast of the adult male are very different from those of the Mourning Dove, but females and immature birds do not possess these marks.

Distribution.—Formerly eastern North America, from Hudson Bay southward, and west to the Great Plains, straggling thence to Nevada and Washington. Breeding range mainly restricted to portions of Canada and northern border of the United States as far west as Manitoba and the Dakotas. Now probably extinct.

Formerly the Wild Pigeon was one of the best known birds of the state, appearing in immense flocks nearly every spring and almost invariably in autumn in all parts of the state. Where "mast" was abundant small numbers lingered until snow came, and a few frequently remained in the southern counties through mild winters. The great invasions, however, by hundreds of thousands or even millions, usually took place suddenly in April, and the birds began nesting early in May.

This species was always partial to hardwood growths, and a large "nesting" or "roost," as it was often called, was almost always located in or near an extensive area of hardwood timber where food was abundant. When a nesting tract had been selected, however, the pigeons used trees of every kind beech maple, birch oak tamarack, cedar (arbor vitæ), hemlock, pine, etc., and scores, or even a hundred nests were placed in a

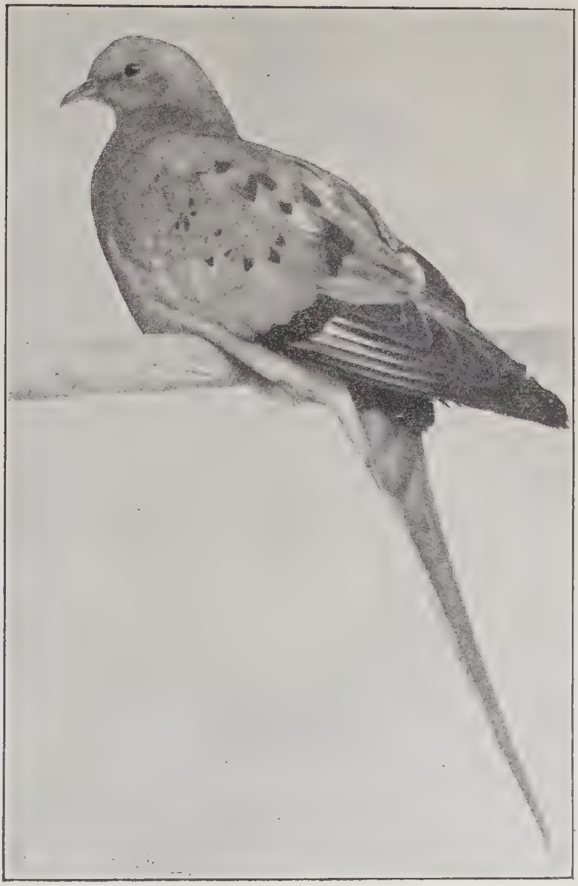

Plate XV. Passenger Pigeon. Adult Male.
Photograph from life. Courtesy of American Field.

single tree, sometimes only a few feet above one's head, but more often at heights of twelve to fifty feet.

The nests were merely flat platforms of twigs loosely put together, small and scarcely hollowed, while no attempt at concealment was made. Here a single egg was laid and usually this was incubated and hatched alone. In some cases two eggs were found in a nest, and a few observers claim that a second egg was usually laid soon after the first one hatched, the heat of the young bird helping to incubate the second egg. Nevertheless most authorities believe that but one egg was laid by each bird, the cases in which two eggs were found in a nest being explained on the supposition that two females used the same nest.

Much uncertainty as to the period of incubation seems to exist, different writers allowing from 13 to 24 days. The majority state that the period is 18 to 20 days, and this is the time given by Bendire (Life Histories, Part I, 1892, p. 138). On the other hand, David Whittaker of Milwaukee, who had a flock in confinement for many years, states that the period of incubation is "fourteen days almost to a day, and if the egg is not hatched then the birds desert it." Mr. Whittaker also states that he has never known any of his birds to incubate more than a single egg at a time, although each female laid on an average three or four eggs each season, and some laid as many as 7 or 8 (Auk, XIII, 1896, 234-237). The eggs, scarcely separable from those of the domesticated dove, are white, unspotted, elliptical, and measure 1.47 by 1.02 inches.

Studies of the large breeding places of the Pigeon show that at least in Michigan nesting began frequently by the middle of April and lasted normally until late in June or even into July; thus, the period of incubation being less than three weeks, and the young remaining in the nest only about two weeks, it seems evident that many of the birds, if not all, must have reared at least two broods.

Many of the netters claim that the old birds pushed the young out of the nests before they were able to fly and at once deserted them leaving them to get what food they could from the ground for a few days, until they learned how to fly and were able to shift for themselves. They were said to be extremely fat when pushed out of the nest and this prevented them from starving during the interval. Meanwhile the parent birds were said to move away to a distance of twenty to fifty miles and at once construct a new nest where another squab was reared. However this may be, it has been repeatedly observed that for many weeks after a nesting was founded it continued to grow in extent, spreading more or less in all directions, but usually becoming an elongated area, from two to four miles in width and often twelve to twenty miles in length, sometimes even larger.

The nests themselves were mere platforms of twigs and small sticks, carelessly interwoven and so fragile as to be easily dislodged or shaken to pieces. In many cases the single egg was distinctly visible from below, through the bottom of the nest. Apparently both sexes took part in the construction of the nest, but in the case of birds which have been watched in captivity the female has been seen to arrange the material brought by the male. After the eggs were laid the birds took turns in brooding and the greatest uniformity is said to have prevailed in this respect throughout the entire colony. Thus several different observers agree that the males remained on the nest from nine or ten o'clock in the morning until about two in the afternoon when their places were taken by the females, who sat through the night and until about nine o'clock the next morning. The females thus fed mostly during the forenoon and the males early in the morning and again late in the afternoon. According to one observer "the sitting bird does not leave the nest until the bill of its incoming mate nearly touches its tail, the former slipping off as the latter takes its place." The males all returned from feeding at about the same time and the females went off to feed as soon as they were relieved from the duties of incubation. Thus there were two periods of great activity about the nesting place, one between nine and ten in the morning and the other between two and three in the afternoon. Of course there was also a general return of all the males just at nightfall and a similar general departure in the early morning when these birds went out again to feed. It is stated by many writers that the male bird fed the female while on the nest, and this seems not improbable, as they were frequently seen putting their bills into each others mouths much in the manner in which they feed the young. As with most other species of pigeons the young were fed entirely by disgorging the contents of the crop, the food having been softened for a time in the crop of the parent before the young were fed.

The food during a large part of the year was almost entirely of a vegetable nature, consisting principally of acorns, beech nuts, corn, wheat, rye, oats, buckwheat and the seeds of various wild grasses and weeds. But during the nesting season, and probably to a considerable extent at other times, the Pigeon fed largely upon animal substances. and particularly, if we can credit numerous observers, upon angleworms and various grubs and soft-bodied insects which are to be found in moist places. A few writers state that the Pigeon was fond of roots or tubers of various kinds, and that it scratched and dug for these with great energy, frequenting for this purpose the softer grounds about the edges of swamps and marshes. It seems likely, however, that a large part of the food obtained under such conditions was the animal food already alluded to.

Pigeons are said to have been remarkably fond of salt, or rather of the mud which is impregnated with the saline matter from salt springs. In every region where Pigeons have been netted or trapped in any way use seems to have been made of this fact, and so-called "salt beds" have been prepared for the purpose of attracting them. The method varied with different trappers, and the particular formula used was often guarded as a secret of great importance. The process, however, always involved the clearing of a patch of soft rich ground from all grass, weeds and brush, and this was thoroughly moistened with brine, and frequently grain of various kinds was scattered upon it and rolled or tramped in. after which a second treatment with salt, or in some cases with saltpeter or sulphur, was given; in other cases anise seed or anise seed oil was spread upon the bed. In this way Pigeons were baited in large numbers, and after they had become accustomed to the spot a net was so arranged that it could be sprung over the bed and a large number of Pigeons captured at once.

In other cases neither salt nor anise was used in order to attract the birds, but merely wheat, corn, or other grain. One Pennsylvania netter. with whom the writer talked, stated that after the young were hatched the old birds refused to eat grain and he secured several thousand Pigeons by baiting them with angleworms which he dug for the purpose in large quantities.

Pigeon netting was a recognized trade or pursuit in the early history of the country and thousands of persons engaged in it whenever the conditions were favorable. Aside from the baiting already described "stool

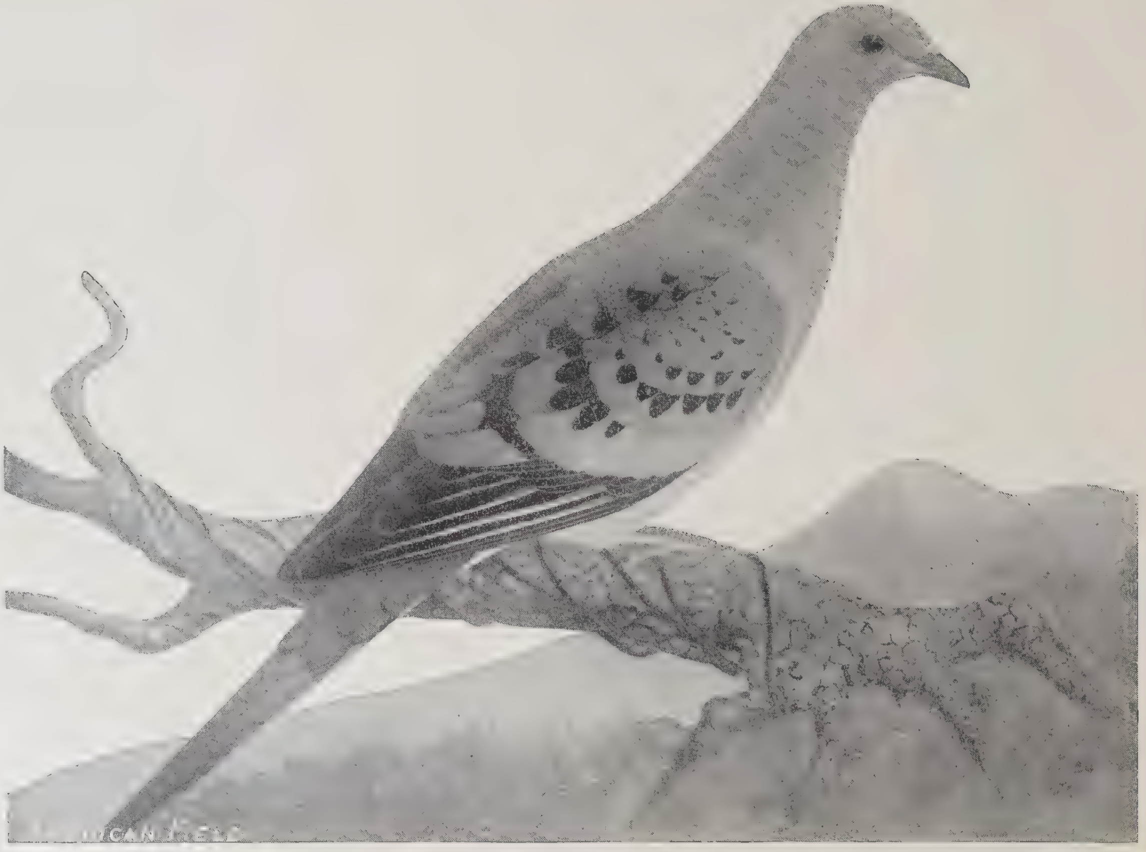

Plate XVI. Passenger Pigeon. Adult Female. Courtesy of American Field. (Photograph from mounted specimen.)

pigeons" (that is, captive wild pigeons, blinded or hooded, and made to flutter or spread their wings by manipulation with a string attached to a movable perch) were used, and during the great migratory flights in spring and fall these stool pigeons and "flyers" were indispensable to the capture of any considerable number. They were used for decoying the birds to the netting grounds just described, as well as to a dead tree, or a framework of poles arranged within easy gun shot of a blind, from which the gunner could rake the pigeons after they had alighted.

The literature of pigeon netting is so extensive that it is impossible to go into the matter here. Those who are interested in this subject, as well as in the methods which contributed largely to the extermination of the Pigeon, are referred to the excellent book by W. B. Mershon, of Saginaw, Mich., entitled "The Passenger Pigeon." (Outing Publishing Co., New York, 1907.)

Estimates of the number of pigeons nesting in any one place are extremely variable. Not a few writers claim that from a billion to a billion and a half assembled at one place to nest. Other writers believe that not more than five to ten millions were found together, while still others are doubtful if more than one or two millions have ever nested at one time in the same region. Apparently the largest nesting of which we have definite knowledge was that which was located near Petoskey, Emmet county, in 1878, which has been frequently described as from twenty-eight to forty miles in length by three to ten miles in 'width. Within this region one writer states that at least 150,000 acres were included and that the nesting actually covered at least 100,000 acres. Since almost every tree had some nests, and as many as 110 nests have been counted in a single tree, it is possible to form some conception of the number of pigeons which reared their young at this place.

It is stated that from this nesting the first shipment of birds was made on March 22, 1878, and the last upon August 12, during which time the war against the hapless birds was waged with varying intensity. "For many weeks the railroad shipments averaged fifty barrels of dead birds per day, thirty to forty dozen old birds and about fifty squabs being packed in a barrel. Allowing 500 birds to a barrel, and averaging the entire shipments for the season at 25 barrels per day we find the railroad shipments to have been 12,500 dead birds daily, or 1,500,000 for the summer. Of live birds there were shipped 1,116 crates, six dozen per crate, or 80,352 birds. These were railroad shipments only and not including the cargoes by steamer from Petoskey, Cheboygan, Cross Village, and other lake ports, which were as many more" (H. B. Roney, American Field, Jan. 11, 1879).

Squabs were considered special delicacies and were collected in immense numbers by jarring the smaller trees, felling the larger ones, or even by setting fire to the loose bark of the birches, which were favorite nesting trees. In addition to the thousands destroyed in this way, and the hundreds of thousands shipped yearly for food and for trap shooting, the Indians of Northern Michigan, as well as many of the white residents in the neighborhood of the roosts, collected immense numbers of adults and squabs and preserved them for winter use by salting or smoking and drying.

Dr. Isaac Voorheis of Frankfort, Mich., told the writer personally that in 1880 or 1881, when there was a large nesting in Benzie county, he took, at one throw of the net, 109 dozen and 8 pigeons (1,316 birds), and that six catches of the net brought him $650. These birds were kept alive until a schooner load was obtained, when they were sent directly to Chicago for trap shooting. Dr. Voorheis states that at one time he had so many pigeons alive in crates that it took seven bushels of corn per day to feed them. This was the last nesting in that part of the state, so far as Dr. Voorheis knows, and it was broken up by a heavy fall of snow, at least eight inches, after most of the nests had eggs. All the old birds left in a body and never came back.

In several other cases large nestings are said to have been broken up by heavy falls of snow, and in still others the entire hosts of pigeons abandoned the nesting grounds apparently as the result of the persecution to which they were subjected. During the years 1874 and 1876 there were immense nestings near Shelby, Oceana county, and, perhaps owing to the favorable location of the birds, larger numbers were shipped from these roosts than from any other recent roosts of which we have data. One dealer alone claims to have shipped 175,000 pigeons from the Shelby nesting during a single season, and states that in that year (1874) the shipments of birds from the Shelby nestings averaged about 100 barrels per day for more than thirty days.

The disappearance of the Passenger Pigeon furnishes one of the most remarkable and interesting problems of which we have any record, both because of its suddenness and completeness. Up to about 1870 the bird was considered a veritable pest by the farmers of the state, and the only good obtained from it was the supply of food which it furnished from year to year. Up to that time no attempt to protect it by legislation had been made, and probably no one would have countenanced such an attempt. Even as late as 1878 Pigeons were extraordinarily abundant in all the upper counties of the Lower Peninsula, and according to several authorities not only did millions nest near Petoskey, Emmet county, that summer, but a nesting about half as large was located near Boyne Falls, Charlevoix county, and another "farther south, on the Manistee River, some 26 miles long by 5 average width, or 130 square miles, in which the birds hatched three times, and from which not a bird was caught, as it was an impenetrable swamp" (Quoted by Mershon, 1907, p. 94).

For some time previous to this the Michigan game law included the Pigeon among the game birds, and certain sections nominally protected the birds while nesting, prohibiting the use of nets within certain distances of nesting grounds and also prohibiting the shooting of pigeons within several miles. These sections, however, were seldom if ever enforced, owing to the difficulty of getting sufficient evidence to convict, as well as to the attitude of residents in the neighborhood, who were all interested in the business furnished by the Pigeons and unwilling to enforce a statute which was objectionable. Each nesting was besieged by an army of professional pigeoners, the total number of professionals often reaching 500 or even 800, while residents of the vicinity, and other amateurs, increased the number to a thousand or more. The business of pigeon catching was sometimes a very lucrative one, and even under unfavorable circumstances the local farmers and business men looked upon it as a boon which should be utilized to the full.

In 1897 the legislature enacted a law prohibiting the killing of the Passenger Pigeon at any time of year, for a period of ten years, and in 1905 the Passenger Pigeon was removed from the class of game birds to that of non-game birds, so that its killing at the present time is illegal at any season. The prohibition, however, appears to have come too late, for there is every reason to fear that the species is totally extinct not only in Michigan but elsewhere.

So far as we can learn, the last nestings of any importance in Northern Michigan occurred in 1880 and 1881. In 1880, according to Chief Simon Pokagon, there was a large nesting on the Platte River, Benzie county, and in 1881, according to Mr. S. S. Stevens of Cadillac, there was a nesting of moderate size, perhaps eight miles long a few miles west of Grand Traverse. In 1886 Mr. Stevens found a small flock, "of about fifty dozen pairs," nesting in a swamp near Lake City, Missaukee county, and this, so far as we can learn, is the last instance in which more than two or three pairs have been found nesting together.

In 1888 Mr. William Brewster and Mr. Jonathan Dwight, Jr., of Cambridge, spent several weeks in Northern Michigan in the hope of studying a large nesting of the Wild Pigeon, but although thousands of pigeons appeared in the neighborhood of Cadillac late in April of that year, and a few pairs bred here and there in the surrounding woods, the greater number disappeared before the middle of May, and are not known to have returned. They were traced northward as far as Oden, Emmet county, and are presumed to have crossed the Straits of Mackinac and nested somewhere in the Upper Peninsula, or even in the British possessions north of Lake Superior.

Since that date (1888) no large flocks of Passenger Pigeons have been seen anywhere, and since 1890 the occurrence of single individuals or small squads has been considered worth recording in the scientific journals, on account of the rarity of the bird. A few individuals were taken here and there in the eastern United States in 1894, 1895 and 1896, but they were almost invariably single birds or pairs.

In the summer of 1893 a careful observer (Vernon Bailey), at Elk River, Minnesota, stated that two or three flocks, of four to six birds each, were seen during the summer, and two pigeons were killed, but he had heard of no nests (McIlwraith, Birds of Ontario, 1894, p. 185). Another observer reported a flock of 500 pigeons seen in Aitken county, Minnesota in the spring of 1894 (Auk, XII, 1895, 80). One was shot in the northeast corner of Delta county, Mich., October 1, 1895, by Dr. E. Copeland and one was taken at Delevan, Wisconsin, September 8, 1896.

The last specimen taken in the United States, so far as we can learn, was an immature bird shot September 14, 1898, at Chestnut Ridge, near Delray, Wayne county, Mich., by Mr. P. H. Clements of Detroit. This bird was mounted by Campion of Detroit, and is now in the collection of Mr. J. H. Fleming of Toronto (Auk, XX, 1903, 66).

Of course there have been scores of reports of the occurrence of pigeons during the last ten years, but in most cases investigation has shown them to be based upon the Mourning Dove or Carolina Dove, which is so similar in general appearance to the Passenger Pigeon that even the expert is likely to be mistaken unless the utmost care is exercised (Examine Plate XVII). It is barely possible that a few small flocks of Passenger Pigeons still exist and nest somewhere in the more remote sections of Michigan or the Dominion of Canada. It should be noted, however, that the reports of the abundance of the Passenger Pigeon in California and the far southwest are entirely erroneous, being based upon the presence there of an entirely different bird, the Band-tailed Pigeon (Columba fasciata) which is restricted to the western United States, from the Rocky Mountains to the Pacific.

As to the cause or causes of the disappearance of the Passenger Pigeon the greatest diversity of opinion exists. Most naturalists agree that man's warfare upon the bird on its nesting grounds has been the prime cause of its extinction; but there are not wanting those who refuse to admit this, and it seems perfectly certain that other causes must have combined to effect the complete extermination. Some believe that the development of some unknown but deadly parasite was responsible for the death of the Pigeon host, and it is pointed out that the gregarious nature of the birds would favor the increase and spread of such a parasite, which might naturally pass through a cycle which would culminate in the practical extermination of the Pigeon. There is, however, not a particle of direct evidence to support this theory. A similar theory ascribes the sudden disappearance to some unknown disease.

The fact that during sudden and heavy storms, and particularly during foggy weather and snow storms, hundreds and perhaps thousands of pigeons have been drowned in the waters of the Great Lakes gives color to the supposition that the last remaining bands of pigeons may possibly have perished in this way. Unquestionably the clearing away of the great pine and hardwood forests of the north has been very largely responsible for the rapid decrease, since this removed their principal food supply of beech nuts, acorns and the seeds of various conifers, and these areas, recently cleared by the lumberman's axe, were almost invariably devastated soon after by fire, which in some cases swept over entire counties and left hundreds of square miles a barren wilderness.

In the opinion of the writer the most probable cause of the disappearance of the pigeon lies in the fact that, through this clearing of the forests and the increasing persecution by man, the birds were driven from one place to another and gradually compelled to nest farther and farther to the north, and under conditions successively less and less favorable, so that eventually the larger part of the great flocks consisted of old birds, which, through stress of weather and persecution, abandoned their nesting places and failed to rear any considerable number of young. Under such conditions they would naturally become weaker, or at least less resistant, each year, and in the attempt to find nesting places in the far north they may have been overwhelmed by snow and ice during one or two of the unusually severe summers which occurred between 1882 and 1890.

Many attempts have been made to domesticate the Wild Pigeon and the birds have proved hardy in captivity and have nested somewhat freely; yet no domesticated race has ever been established, and so far as can be learned not more than two individuals of this species are now living in any zoological garden or aviary in the world. Audubon sent living specimens to a British nobleman, the Earl of Kirby, as early as 1830, and they lived and bred for many years, but seem to have died out eventually. Mr. David Whittaker of Milwaukee, Wisconsin, secured a pair of young Passenger Pigeons from northeastern Wisconsin in the fall of 1888, and in the course of eight years succeeded in breeding from them a little flock of fifteen birds, six males and nine females. Many eggs were laid each year, but few of the young which were hatched could be reared, apparently for lack of proper food. This flock was divided, part of it going to Dr. C. O. Whitman of Chicago University, who in 1904 had ten birds, but thought they had been much weakened by inbreeding, as few of the eggs were fertile and the flock steadily decreased. The following year only four were left. Meanwhile the original Milwaukee flock had decreased in the same way,

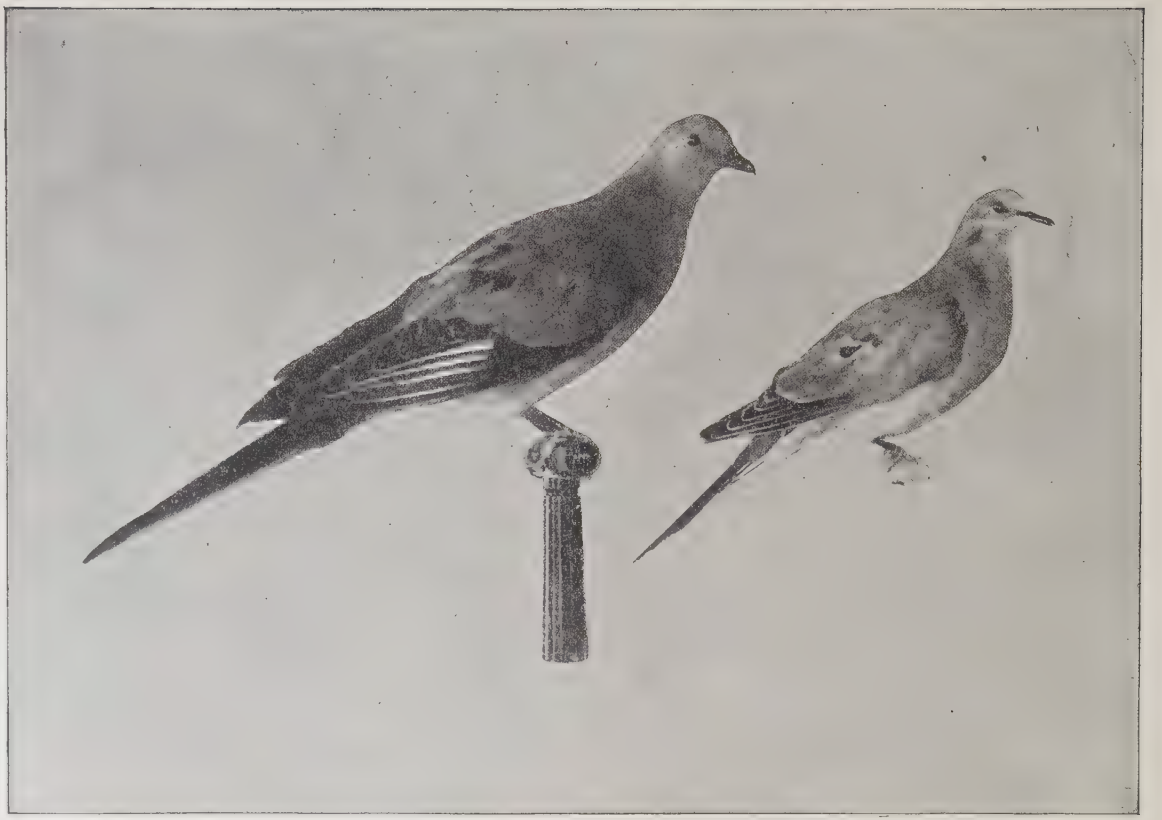

Plate XVII. Passenger Pigeon and Mourning Dove.
Photographed from museum specimens placed at exactly the same distance from the camera.

and in 1908 there were but seven left, six males and a single female, apparently barren. Since that time all the remaining birds of both flocks have died, with the possible exception of a female which Dr. Whitman sent to the Cincinnati Zoological Society in 1902, which was infertile in 1909 at the age of thirteen years. At that time the Cincinnati Society had a single male left, about twenty-four years old and not likely long to survive. For a history of the Milwaukee flock, with interesting details of the life of the pigeon in captivity, the reader is referred to Mr. Mershon's book already cited.

The belief that the Passenger Pigeon was a bird of remarkable vitality, endurance, and powers of flight undoubtedly has a good foundation, but all these powers combined might prove useless against that dominating fear which compelled the bird to turn from the known dangers of civilization—the axe, the gun, and the forest fire, toward the inhospitable and semi-arctic regions of the far north. We may hope that a remnant of the great hordes which once swept over our state still exists somewhere and may eventually restock our forests, but it must be confessed that this is far more a hope than an expectation, and with each succeeding year this hope grows fainter.

TECHNICAL DESCRIPTION.

Adult male: Entire head, including sides and chin, together with back of neck, back, rump and most of upper surface of wings, clear plumbeous or bright slate-blue, the scapulars and tertiaries with a few large black spots, the lesser wing-coverts with similar but smaller ones; lower throat, breast, sides and belly, rich reddish brown, deepest on throat and chest, paler and more pinkish (vinaceous) on the sides and abdomen; sides of neck and base of neck behind with a rich, metallic, red-purple iridescence; anal region and under tail-coverts white; wings brownish black, several of the shorter primaries with broad bluish-white areas on the outer webs near the base, and a narrow white edging even to the tips; two middle tail-feathers entirely black, the rest slate blue at base, grading into pure white at tip, each feather with a broad black area and a bright brown "thumb-mark" on the inner web near the base. Bill black; feet and iris red. Female: Similar as to wings and tail, which, however, are dull slate instead of black; black spots on the wing-coverts tending to form two or more bars; no clear slate blue anywhere, but head and neck mainly brownish-gray, the back and breast grayish-brown, and the sides of the neck glossed with metallic colors as in the male, but much more faintly. Young birds resemble the adult female somewhat, but most of the feathers above and below have distinct white margins, and the light borders on the wing-feathers are broader, giving a mottled appearance.

Length of male 15 to 17.25 inches; wing 8 to 8.50; tail 8.20 to 8.75. Female and young somewhat smaller.

129. Mourning Dove. Zenaidura macroura carolinensis (*Linn.*). (316)

Synonyms: Carolina Dove, Turtle Dove, Dove.—Columba carolinensis, Linn., 1766, Wils., Aud., Nutt. and others.—Turtur carolinensis, Briss.—Ectopistes carolinensis, Rich.—Columba marginata, Linn., Wagl.—Ectopistes marginata, Gray.

Plate XVII and Figures 64, 65, 66.

Not likely to be mistaken for any other bird, with the exception of the Passenger Pigeon. It differs from the latter in its decidedly smaller size, in having fourteen tail-feathers instead of twelve, and in having a distinct blue-black spot on the side of the neck.

Distribution.—Temperate North America; from southern Maine, southern Canada, and British Columbia, south to Panama and the West Indies, breeding throughout its North American range.

The Mourning Dove is an abundant resident of the southern half of the Lower Peninsula during the warmer two-thirds of the year, and in the southernmost counties a few frequently winter; indeed it is not an uncommon thing to see a few individuals as far north as Lansing at any time of the year when the ground is bare or nearly bare of snow. North of the Saginaw Valley the Mourning Dove is much less common, although there are numerous records of its occurrence, even in the Upper Peninsula. Mr. Thos. B. Wyman has noted it three times at Munising, Alger county, and thinks he has seen it once or twice more when he failed to record the exact date. Mr. Ed. Van Winkle says it is not common in Delta county, but breeds there occasionally. A flock of "wild pigeons" reported from Marquette in the summer of 1904, doubtless was a flock of Mourning Doves.

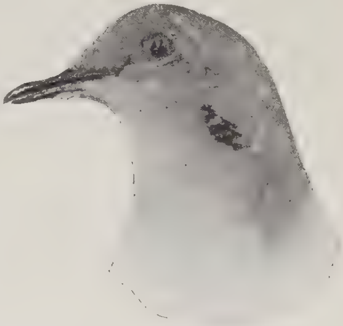
Fig. 65. Mourning Dove.
From photograph of mounted specimen.
(Original.)

It is one of the first birds to arrive in spring, coming at about the same time as the Bluebird, Robin, and Meadowlark, usually in advance of the Killdeer. It commonly arrives in pairs, but occasionally in small flocks of three to ten individuals, which soon separate and begin nesting.

With us the nest is usually placed on the horizontal branch of a spreading tree, and not more than eight or ten feet from the ground. Frequently it is placed in a bush or a tangle of vines, at an elevation of but three or four feet, and instances are by no means uncommon in which the eggs are placed directly upon the ground with only the merest apology for a nest. In prairie regions farther south and west this is the common mode of nesting, while in New England the nest is almost invariably placed in trees. It is difficult to determine the number of broods, but in southern Michigan eggs may be found during every month from April to September inclusive, and there are reports of sets in October and November.(?) Doubtless two broods are always reared, and in case of disaster the bird may repeat the attempt several times. By the first of July small companies of doves may be found feeding in stubble fields and brushy pastures, and the size of these flocks increases until in September sometimes a hundred individuals or more will be found feeding in the same field, although when alarmed they seldom unite into one large flock, more often dividing into six to ten small companies. Later in the fall the flocks are smaller yet and when the birds finally move south they generally go in couples or small squads.

This is one of our most useful birds, feeding extensively on weed seeds and never, so far as we are aware, inflicting damage upon any farm crop. It has been accused of injuring peas when ripening on the vines, but I do not know of a single well attested instance. On the other hand it frequently eats insects, particularly grasshoppers, although it is always mainly vegetarian.

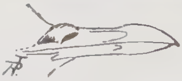
Fig. 64.
Bill of Mourning Dove.

Until recently this was considered a game bird and its destruction was allowed during the fall, but by act of the legislature of 1905 it was transferred to the list of non-game birds, and its killing is now wisely prohibited at all seasons.

The nest is usually very slightly built, of a few twigs, weedstalks and straws, forming a nearly flat platform on which the two white, unspotted, elliptical eggs are laid. These measure 1.10 by .84 inches.

A noteworthy performance of this bird at mating and nesting time seems to have been overlooked by its biographers. An individual leaves its perch on a tree, and, with vigorous and sometimes noisy flapping (the wings seeming to strike each other above the back), rises obliquely to a height of a hundred feet or more, and then, on widely extended and motionless wings, glides back earthward in one or more sweeping curves. Usually the wings, during this gliding flight, are carried somewhat below the plane of the body, in the manner of a soaring yellowlegs or sandpiper, and sometimes the bird makes a complete circle or spiral before again flapping its wings, which it does just before alighting. Occasionally a soaring dove glides downward in this way until within a yard or two of the ground, but more often it perches again at an elevation of twenty or thirty feet. While gliding rapidly downward its resemblance to a small hawk is noticeable.

This peculiar evolution is commonly repeated several times at intervals of two or three minutes, and appears to be a display flight for the benefit of its mate, the assumption being that only the male Dove soars. Although familiar with the Mourning Dove's habits in New England, Western New York, and elsewhere, we have never seen this peculiar flight except in Michigan.

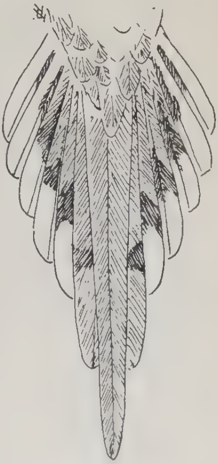
Fig. 66.
Tail of Mourning Dove.

TECHNICAL DESCRIPTION.

Adult male: Forehead, sides of head and neck, and breast, clear pinkish-buff, lightest and most buffy on forehead and sides of head, darkest and pinkest on the breast; chin nearly pure white; sides of the lower neck glossed with changeable metallic violet or reddish purple; a small but distinct blue-black spot on each side of the upper neck; crown and occiput clear bluish gray, becoming brownish on back, rump, upper tail-coverts, scapulars and wing-coverts; the inner wing-coverts and scapulars with distinct rounded black spots; middle tail-feathers like the back, the others slaty blue at base, crossed by a broad black band, the terminal third or more white or bluish white. Adult female: Similar, but duller and browner, with little or no blue-gray on the head, or pinkish on the breast; the purplish area on the neck smaller and fainter; the black neck spots small and dull blackish. Young: Similar to adult female, but many of the feathers of the upper surface, neck and chest, with whitish edgings or tips, the black neck spot and metallic gloss entirely wanting.

Length 11 to 13 inches; wing 5.70 to 6.10; tail 5.70 to 6.50.

Order XII. RAPTORES. Birds of Prey.

Members of this order are at once recognizable by a glance at the structure of the bill and feet, various though the modifications of these parts may be. The strongly hooked bill, provided with a cere, only occurs elsewhere among parrots, and there the feet are totally different, being "yoke-toed", as in cuckoos and woodpeckers, two toes pointing forward and two always backward, while in birds of prey either three toes point forward permanently, as in all the diurnal Raptores except the Osprey, or the outer toe is versatile, that is, may be turned in either direction, as in the Osprey and all owls. In any case the claws or talons are long, curved and sharp, and in all except the American Vultures they are extremely acute and flexibly jointed to the toes, so that the feet become powerful weapons for grasping, piercing and killing the living prey on which these birds mainly subsist.

Three suborders are recognized, separable as follows:

KEY TO SUBORDERS.

A. Head and part of neck without feathers (Fig. 67). Suborder Sarcorhamphi. American Vultures. Page 254.

AA. Head well feathered. B, BB.

- B. Eyes placed at the sides of the head so that the two eyes never look in the same direction. Suborder Falcones. Diurnal Birds of Prey. Page 257.
- BB. Eyes directed forward so that both look in the same direction, surrounded by disks of radiating feathers, the so-called facial disks. Suborder Striges. Owls.

Suborder SARCORHAMPHI. American Vultures.

Family 36. CATHARTIDÆ. Buzzards or Vultures.

Only a single Michigan species, the Turkey Buzzard.

The family (and suborder) is characterized by the naked head, perforate nostrils, short hind toe inserted a little above the level of the three front toes, and the somewhat blunt and not strongly curved claws. The whole structure of the foot is adapted rather for walking or standing than for grasping and killing as in most other Raptores.

130. Turkey Buzzard. Cathartes aura septentrionalis *Wied.* (325)

Synonyms: Turkey Vulture, Vulture, Buzzard, Carrion Crow.—Cathartes septentrionalis, Wied., 1839.—Vultur aura, Linn., 1766, and the older authors generally.—Cathartes aura, Illig., 1811, and most recent writers.—Rhinogryphus aura, Ridgw., 1875.

Figures 67 and 68.

The large size, long, rounded tail, and head entirely naked or merely downy, serve to separate this bird from all others.

Distribution. Temperate North America, from New Jersey, Ohio Valley, Saskatchewan region and British Columbia, southward to Patagonia and the Falkland Islands.

In Michigan the Turkey Buzzard is practically confined to the two southernmost tiers of counties, although it is found sparingly throughout two tiers farther north and wanders occasionally all over the state. Being a bird of remarkable powers of flight and by no means sensitive to cold, it is not surprising that single individuals often extend their wanderings even to the shores of Lake Superior. We have records from nearly all the counties in the southern half of the Lower Peninsula, and reports of single specimens seen or taken in half a dozen localities farther north.

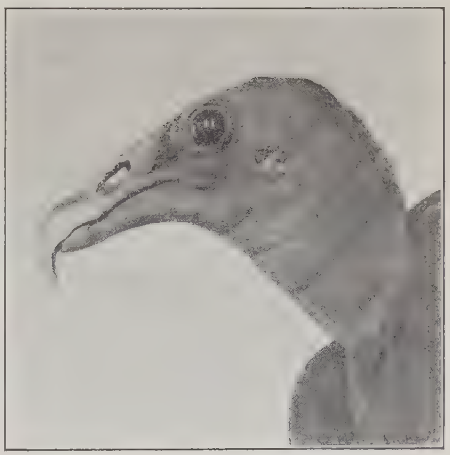

Fig. 67. Turkey Buzzard. Adult.
From photograph of mounted specimen. (Original.)

At Port Huron, Mr. Hazelwood states that he sees from one to five every spring. We have a specimen in the College collection, taken at Riley, Clinton Co.; we examined a specimen at Harrisville, Alcona Co., taken near that place; and a description of one killed near Benzonia, Benzie Co., was sent us several years ago. We also have a specimen taken at the Agricultural College, and Mr. C. J. Davis, of Lansing, has one in his collection, which was killed at Fowlerville, Livingston county. There is a specimen in the Broas Collection (now in the College Museum), taken in Ionia county, and it has been recorded several times from Kent county. Mr. Ed. Van Winkle, of Vans Harbor, writes that he has seen about a dozen specimens in Delta county (Upper Peninsula) during the past fifteen years; and Mr. Thomas B. Wyman, of Negaunee, Mich., writes that a specimen was seen there June 20, 1905, by Mr. E. A. Doolittle, of Painsville, Ohio, who knows the species well and could not be mistaken. Incidentally it may be noted that J. H. Fleming has recorded a specimen taken at Moose Factory, James Bay, in June 1898 (Auk, XX, 66).

The nesting habits are somewhat peculiar. The birds commonly nest in a hollow tree, the hollow of a fallen log, the arched cavity beneath a large stump, or a small cave or pocket in a ledge of rocks. Some times the eggs are laid in the hollow top of a sycamore stub fifty feet or more from the ground, but more often they are placed on or near the ground in some such place as just indicated. There are several well attested instances of nests found in Michigan, and probably in the counties bordering Indiana and Ohio considerable numbers nest every year. Jerome Trombley states that a pair nests regularly in a hollow sycamore near the Raisin River at Petersburg, Monroe county, and that other pairs have nested in that vicinity. May 30, 1903, a nest with two eggs was found in a swamp near Freedom, Washtenaw county by Mr. John Uphaus, and the birds have nested in that vicinity regularly for several years. Mr. S. E. White and E. Durfee took two eggs at Douglas, Allegan county, in 1891.

The eggs are always two, and are usually laid on the bare ground, or on the chips and rubbish accumulated at the bottom of the hollow in which they are found, without any sign of a nest. They measure 2.74 by 1.89 inches, and are usually buffy or greenish white, spotted and blotched with rich brown and purplish gray. The young are covered with white down, except the fore part of head, which is naked from the first.

The food of the Turkey Buzzard is mainly carrion, but it also eats snakes, toads, and probably rats, mice, and occasionally young birds that chance to fall in its way. It does not, however, attack poultry or game birds, nor does it regularly search for and destroy the nests of other birds. On the whole it is a beneficial species and should be rigorously protected. On the wing it is one of the most graceful of birds and soars for hours at a time in fair weather, wheeling in endless circles high above the earth, always on the lookout for food. It is commonly believed to find its food through the sense of smell, but this has never been proved. It seems much more probable, from the evidence at hand, that it depends primarily upon sight, and the gathering of large numbers about some newly discovered food is due simply to the keen watch kept on each other, so that the motions of the discoverer are immediately noted by others at a distance, and when these stop circling and start toward the feast birds which are still farther away notice the unintentional signal and speed in the same direction.

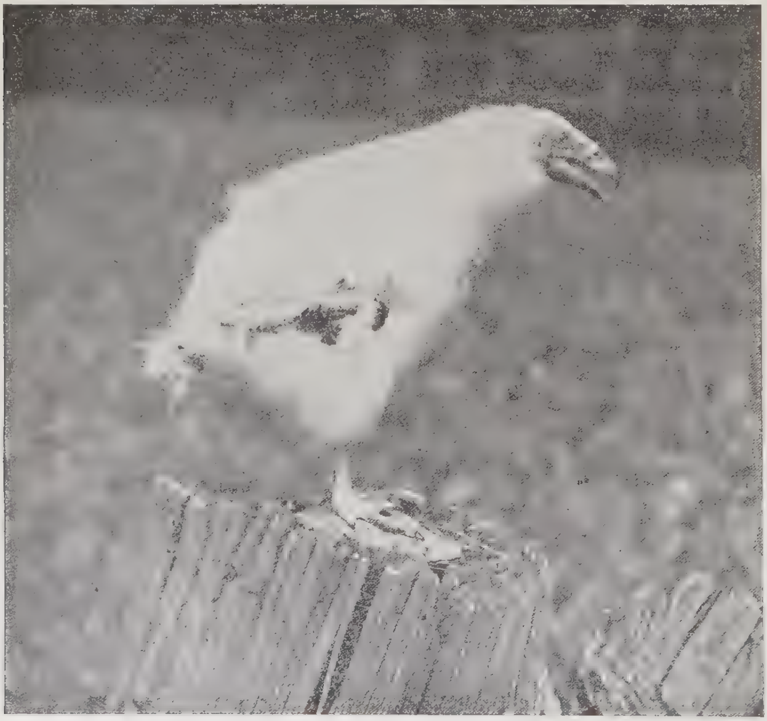

Fig. 68. Turkey Buzzard. Four weeks old.

Photographed from life. From Bird Lore, by courtesy of Dr. Thomas H. Jackson.

TECHNICAL DESCRIPTION.

Head and upper part of neck entirely bare or with only a few "bristles;" wings very long, when folded their tips reaching to or beyond the tip of tail. Tail much rounded.

Adult: Nearly uniform black, dull below, glossy above; the feathers of back, scapulars and wing-coverts more or less margined with grayish brown. Bill white; iris brown; naked skin of head dull red; feet brownish black. Young: Similar, but bill blackish, head dusky, and general color of upper parts black, with less brown on scapulars and wing-coverts. The young when just hatched, and for several weeks thereafter, is covered with pure white down except on the head which is largely naked.

Length 26 to 32 inches; extent about 6 feet; wing 20 to 23 inches; tail 11 to 12; culmen 1.

Suborder FALCONES. Diurnal Birds of Prey.

This suborder includes all our birds of prey except the Turkey Buzzard and the owls, and under the scheme of classification recently (1910) adopted by the American Ornithologists' Union, is divisible into three families, viz., the Buteonidæ, comprising a majority of all the species, the Falconidæ or true falcons (four species), and the Pandionidæ or ospreys, a single species. The latter, the Fish Hawk, is unique in the structure of its foot, which has the outer toe reversible, the lower surface of all the toes thickly studded with spicules, and the claws or talons strong, slender, much curved, extremely sharp, and all of the same length—adaptations for holding the slippery prey on which it lives. The other families, Buteonidæ and Falconidæ are defined with difficulty, the single point by which they can be diagnosed sharply being the anatomical structure of the shoulder, only to be determined by dissection. It seems best therefore not to attempt to separate the three families here, but to give an artificial key for all the species of the suborder, as follows:

KEY TO SPECIES.

A. Fourth toe (outer toe) reversible, i. e. turning either to the front or back; claws of all the toes approximately the same length. Osprey or Fish-hawk. No. 148.

AA. Fourth toe not reversible; claws of unequal length, that of the hind toe usually longest, that of outer toe shortest. (Fig. 71.) B, BB.

B. Very large birds, wings 20 inches or more. C, CC.

C. Tarsus or shank feathered to base of toes. (Fig. 74). Golden Eagle. No. 143.

CC. Lower third or half of tarsus without feathers. Bald Eagle. No. 144.

BB. Not so large, wing from 6 to 18 inches. D, DD.

D. Cutting edge of upper mandible toothed and notched (Fig. 75). E, EE.

E. With two or more teeth and intervening notches on each side; general color bluish-gray, almost white on head; wing 10.30 to 12.30. Mississippi Kite. No. 133.

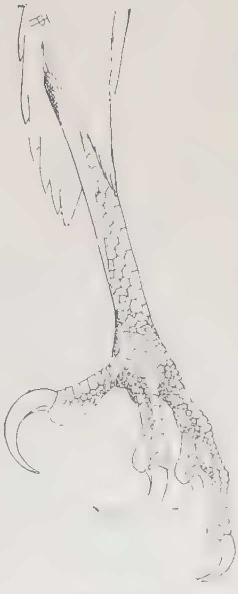

Fig. 71.

EE. With but one distinct notch, separating the hooked tip of the mandible from a single sharp, tooth-like projection just behind it. F, FF.

F. Five outer primaries emarginate near tip. Sharp-shinned Hawk. No. 135.

FF. Only one or two primaries emarginate. G, GG.

G. Wing over 10 inches. Duck Hawk. No. 145. Possibly also the Gyrfalcon (Appendix).

GG. Wing less than 10 inches. H, HH.

H. Back and tail bright rust-red, usually with regular cross bars of black. Sparrow Hawk. No. 147.

HH. Back and tail without any rust-red, usually slaty-blue or brownish black, the tail with a few (four or five) white cross-bars. Pigeon Hawk. No. 146. Possibly also Richardson's Falcon (Appendix).

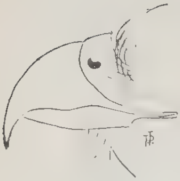

Fig. 72.

DD. Cutting edge of upper mandible not toothed and notched (Fig. 72). I, II.

I. Small hawks, wing less than 12 inches. J, JJ.

J. With only two outer primaries emarginate near tip. White-tailed Kite. No. 132.

JJ. With more than two primaries emarginate. K, KK, KKK.

K. With three emarginate primaries. Broad-winged Hawk. No. 141.

KK. With four emarginate primaries (Fig. 73). Red-shouldered Hawk (small males). No. 139.

KKK. With five emarginate primaries. L, LL.

L. Tail nearly square at end, that is, tail-feathers all of about the same length. Sharp-shinned Hawk. No. 135.

LL. Tail rounded at end, that is, middle feathers longest and each successive pair shorter, the outermost being the shortest. Coopers Hawk. No. 136.

II. Larger hawks, wing 12 inches or more. M, MM.

M. Tarsus feathered to base of toes. Rough-legged Hawk. No. 142.

MM. Tarsus feathered only part way down. N, NN.

N. Tail deeply forked. Swallow-tailed Kite. No. 131.

NN. Tail not forked. O, OO.

O. Upper tail-coverts pure white. Marsh Hawk. No. 134.

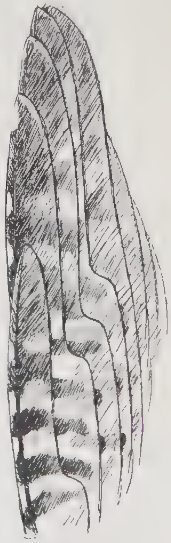

Fig. 73.

OO. Upper tail-coverts not white. P, PP.

P. Tail white, unmarked or at most with an indistinct dark bar toward the tip. White-tailed Kite. No. 132.

PP. Tail not white. Q, QQ.

Q. Only first three primaries emarginate on inner webs near tip. Swainson's Hawk. No. 140.

QQ. First four primaries emarginate on inner webs. R, RR.

R. Tail rust red, usually with a black bar near tip. Red-tailed Hawk (adult). No. 138. Possibly also the Western Red-tail (Appendix).

RR. Tail not red. S. SS.

S. Tail blackish, crossed at regular distances by about five narrow white bars. Red-shouldered Hawk (adult). No. 139.

SS. Tail crossed by seven or eight dark bars and an equal number of light ones. T, TT.

T. The dark bars wider than the light ones; primaries with much rusty or bright buff basally. Red-shouldered Hawk (immature). No. 139.

TT. The light bars wider than the dark ones; no buff or rusty on base of primaries. Red-tailed Hawk (immature). No. 138.

QQQ. First five primaries emarginate on inner webs near tip. Goshawk. No. 137.

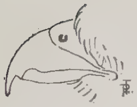

Fig. 75.

Family 37. BUTEONIDÆ. Kites, Hawks and Eagles.

131. Swallow-tailed Kite. Elanoides forficatus (*Linn.*). (327)

Synonyms: Swallow-tailed Hawk, Swallow-tail, Fork-tailed Kite, Snake Hawk.—Falco forficatus, Linn., 1758.—Milvus furcatus, Vieill., 1807.—Nauclerus furcatus, Vig., Swains., Bonap. and many others.—Nauclerus forficatus, Wils., Aud.

A remarkable hawk, instantly recognizable at almost any distance by its resemblance to a gigantic Barn Swallow, the slender wings and deeply forked tail rendering it unmistakable.

Distribution.—United States, especially in the interior, from the Carolinas and Minnesota southward throughout Central and South America; westward to the Great Plains. Casual eastward to southern New England and northward to Manitoba and Assiniboia.

This remarkable bird must be regarded as merely a wanderer from the south which has been taken in Michigan perhaps half a dozen times in the last thirty years.

According to Mr. Norman A. Wood, there is a specimen now in the collection of Egbert Harper, at Saline, Washtenaw county, which was killed there September 15, 1880. A pair was shot June 19, 1882, in Monroe county, and the late W. H. Collins took a specimen near Detroit in 1881. Possibly this is the same specimen recorded by Dr. Gibbs, who states that Mr. Collins wrote him: "One specimen taken seven miles from Detroit in the summer of 1878, now in the Museum of the Detroit Scientific Association." Mr. Edward Arnold took a specimen in Kalamazoo county, in 1897, and there have been several reports of birds believed to be of this species which were seen but not taken. Among these are records by G. A. Stockwell (Forest and Stream, XII, 9, 165), who says that it sometimes breeds in the southwestern part of the state; and a record by Dr. Atkins, who told Mr. Covert that he had seen it at Locke, Ingham county.

It has been taken occasionally in Ontario, and there are records for Illinois, Ohio, Indiana, and Wisconsin.

The nest is placed near the top of a tall tree, frequently near the tip of a limb, and is built of small sticks and sometimes lined with moss and feathers. The eggs are commonly two or three, white or buffy white, boldly spotted with brown, and average 1.87 by 1.49 inches. The species nests commonly in the Gulf States and Texas, but may nest in almost any part of its regular range. There is no reason to suppose, however, that it ever nests in Michigan.

Its food consists largely of snakes, lizards, tree-toads and frogs, but it also consumes myriads of large insects, particularly grasshoppers and locusts. In the southern states, where it is abundant, all observers agree that it rarely if ever touches birds or mammals.

TECHNICAL DESCRIPTION.

Adult: Back, wings and tail clear black, sometimes with metallic reflections; rest of plumage pure white; bill blackish; feet grayish or flesh color. Young: Similar, but head and neck narrowly streaked with blackish, and most of the dark flight feathers edged and tipped with white. Length 19.50 to 25.50 inches; wing 15.40 to 17.70; outer tail-feathers 12.50 to 14.50.

132. White-tailed Kite. Elanus leucurus (*Vieill.*). (328)

Synonyms: Black-shouldered Kite. Milvus leucurus, Vieill., 1818.—Elanus leucurus of authors generally.—Falco dispar, Bonap.

In general appearance resembles a small sea gull, for example, Bonaparte's, and when seen at a distance might easily be mistaken for one of those birds. In the hand, its pure white under parts, bluish gray back, and clear black shoulders, together with the white tail, mark it unmistakably.

Distribution.—Eastern United States from South Carolina and southern Illinois to Texas and California, southward to Chili and Argentine Republic; casual in Michigan. Breeds regularly throughout its general distribution in the United States.

The claim of this bird to a place in the Michigan fauna rests mainly on the statement of A. B. Covert, of Ann Arbor, who says he killed a specimen in September 1878, on the Honeycreek marshes four miles west of Ann Arbor, and that another was killed April 21, 1879, by C. H. Manley, in Livingston county. The latter specimen is said to be mounted and now in the possession of Capt. Manley. The first specimen was for a time in the possession of Mr. Herbert Randall of Ann Arbor, but we have not been able to examine either specimen. The record of a Grand Rapids specimen by Professor Cook was partly incorrect; Mr. Stewart E. White, to whom the capture was credited, merely recorded seeing a specimen. He says: "Identified while on the wing, but I think his peculiar shape and coloration leave slight room for doubt." Dr. Atkins, of Locke, reported it as "a rare summer resident," but there can be little doubt that this was a mistake.

The bird is a southern species, nowhere common, and not likely to occur except as an extremely rare wanderer in southern Michigan. The nest is placed on trees, usually near the water, and the eggs, which average 1.71 by 1.31 inches, are "handsomely marbled or clouded with various shades of rich madder brown on a paler, sometimes whitish, ground" (Ridgway).

Its food is similar to that of the Swallow-tailed Kite, and recent observers do not confirm Audubon's statement that it sometimes feeds on small birds.

TECHNICAL DESCRIPTION.

Adult: Under parts pure white; upper parts bluish gray, bleaching to pure white on the head; a black spot in front of the eye; tail pure white; shoulders (lesser wing-coverts) deep black, rest of wing bluish white above, pure white below. Young: More or less rusty and brown-streaked above; tail crossed by an indistinct dark band near tip; wing-feathers tipped with white. Length 15.15 to 16.75 inches; wing 11.50 to 13.30; tail 5.90 to 7.40.

133. Mississippi Kite. Ictinia mississippiensis (*Wils.*). (329)

Synonyms: Blue Kite.—Falco misisippiensis, Wils., 1811.—Falco plumbeus, Aud., 1831.—Ictinia plumbea, Bonap., Nutt.

Known from other kites by its bluish-gray color, becoming lighter or nearly white on the head, and darkening almost to black on wings and tail.

Distribution.—Southern United States, east of the Rocky Mountains; southward regularly from South Carolina on the coast, to Guatemala, and casually north to Pennsylvania, Wisconsin and Iowa.

The title of this bird to a place in the Michigan list appears to rest on a specimen said to have been taken in Cass county many years ago, and recorded in the manuscript list of the birds of the state by D. D. Hughes. This specimen is said to have been preserved, but we have been unable to get any trace of it. The species is mentioned also in Stockwell's Forest and Stream list where it is said to be "rare in Michigan."

The Mississippi Kite, like several of its relatives, often occurs in flocks and is a tireless and graceful flyer. Its food consists "of insects such as the larger beetles, grasshoppers and locusts, lizards, small snakes, and frogs. It never has been known to molest birds or mammals" (A. K. Fisher).

It nests in the tops of very tall trees, laying two or three nearly white eggs, sometimes faintly marked with pale brown, and averaging 1.63 by 1.32 inches.

TECHNICAL DESCRIPTION.

Adult: Uniform bluish-gray or lead color, becoming lighter on head and darker on wings and tail; inner webs of outer wing-feathers partly rufous. A blackish spot in front of the eye. Iris red; legs and feet dull red. Young: Similar, but streaked and spotted with brown below, and the tail with three or more narrow bands of gray or grayish white. Length 13 to 15.50 inches; wing 10.60 to 12.30; tail 6 to 7.

134. Marsh Hawk. Circus hudsonius (*Linn.*). (331)

Synonyms: Frog Hawk, Bog-trotter, Harrier, Marsh Harrier, Mouse Hawk, White-rumped Hawk.—Falco hudsonius, Linn., 1766.—Circus hudsonius, Vieill., 1807.—Circus cyaneus var. hudsonius, Ridgw., 1872.

Figure 69.

Recognizable in any plumage by the pure white upper tail-coverts which form a conspicuous mark in females and young birds, but not so noticeable in the adult male, which is largely bluish white.

Distribution.—North America in general; south to Panama and Cuba. Breeds throughout its North American range.

The Marsh Hawk is one of our commonest and best known birds, arriving from the south usually in March, often before the uplands are free from snow and before the ice is gone from the marshes. It is commonly seen hunting back and forth over the low grounds, keeping generally within a few yards of the surface and rising above the trees only in passing from one marsh or field to another.

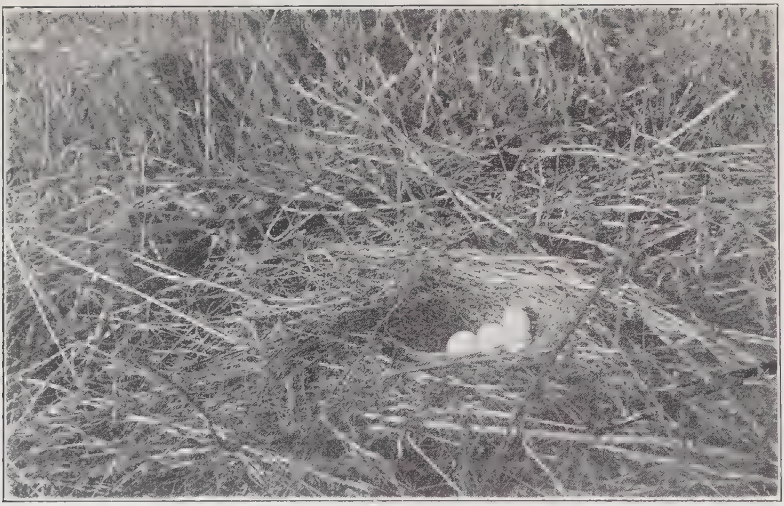

Fig. 69. Nest and Eggs of Marsh Hawk.

From photograph by Thomas L. Hankinson.

Its food is varied, consisting of meadow-mice, ground squirrels, frogs, snakes, insects, and occasionally small birds, mainly blackbirds and the smaller ground-nesting species. According to Dr. Fisher "It is unquestionably one of the most beneficial of our hawks and its presence and increase should be encouraged in every possible way, no' only by protecting it by law but by disseminating a knowledge of the benefits it confers. It is probably the most active and determined foe of meadow-mice and ground squirrels, destroying greater numbers of these pests than any other species, and this fact alone should entitle it to protection even if it destroyed no other injurious animals." Out of 124 stomachs reported on by Dr. Fisher, 7 contained poultry or game birds; 34, other birds; 57, mice; 22, other mammals; 7, reptiles; 2, frogs; and 14, insects.

This hawk is peculiar in nesting always on the ground, where it builds a somewhat bulky nest, mainly of weed-stalks and grass, and lays from four to eight bluish-white, unspotted eggs, the usual number being five or six. Occasionally the ground color is pure white and not infrequently there are a few pale brown spots. The eggs average 1.80 by 1.41 inches. The period of incubation is about four weeks.

In spring these hawks are seen always in pairs, but after the young are able to fly they often hunt in family parties, and later in the season gather into loose flocks of twenty to fifty individuals. Their call note is said to be "a peevish scream, not unlike that of the Red-tailed Hawk, though not so strong" (Bendire, Life Hist. N. Am. Birds, I, 185).

This is one of the birds most often killed by sportsmen, few of whom can resist the temptation of so fair a mark. This is much to be regretted, since the bird does almost no harm and renders incalculable service by the destruction of mice and insects. In Nebraska Professor Aughey found it feeding freely on the Rocky Mountain locust during locust years, and the five stomachs which he examined showed an average of fifty locusts (1st Rep. U. S. Entom. Com., App. 2, p. 43).

TECHNICAL DESCRIPTION.

Face with an imperfect ruff, somewhat as in owls. Adult male: Mostly light bluish gray above, more or less streaked with white, the upper tail-coverts pure white; under parts nearly white, usually with a bluish tinge, and rather faintly streaked with grayish or buffy; wings tipped with blackish, forming an excellent field mark; tail bluish gray with six or more narrow dark bars, the sub-terminal bar being broad and very dark. Adult female: General color deep brown above, streaked with rusty; under parts buffy or whitish, streaked with brown; upper tail-coverts white as in male; tail brown with six or seven distinct blackish bars. Young: Similar to adult female but darker everywhere, and tail with only four dark bands.

Length 19.50 to 24 inches; wing 12.90 to 16; tail 8.80 to 10.50.

135. Sharp-shinned Hawk. Accipiter velox (*Wils.*). (332)

Synonyms: Pigeon Hawk, Sparrow Hawk, Bird Hawk, Chicken Hawk, Bullet Hawk. —Falco velox, Wils., 1812.—Falco fuscus, Gmel., 1789.—Accipiter fuscus, Bonap., 1838, and authors generally.—Nisus fuscus, B. B. & R., 1875.

Plate XVIII.

Known by the small size, comparatively short wings and long tail, and especially by the slender legs and feet and the remarkably long toes. As with many hawks, adult plumage is not acquired for several years and the fully mature birds are entirely different in color and markings from younger ones. This species is not likely to be confounded with any other save the Cooper's Hawk, but the latter is commonly much larger and the end of tail rounded instead of square.

Distribution.—North America in general; south to Panama Breeds throughout its North American range.

This little hawk is known in different parts of the state by different names, as indicated above. but it is most often called "Sparrow Hawk," a name to which it has every natural right, since it feeds largely upon small birds; but unfortunately the name "Sparrow Hawk" is the one given in almost all our books of reference to the little falcon, or Kestrel, which is almost equally common, but which feeds much more commonly upon insects and mice than upon sparrows.

The present species, the Sharp-shinned Hawk, is one of the few really injurious hawks which is common in Michigan. It prefers feathered game to anything else and creates havoc among the bird population of our fields and forests during its presence with us. During migration it is generally distributed over the state, but passes northward for the nesting season, so that it is seldom found in southern Michigan after the first of June. It nests usually in evergreen trees—pines, spruces, tamaracks, or cedars, building a rather compact nest of sticks and twigs and laying from two to five heavily blotched eggs, which average 1.47 by 1.16 inches. It has been reported nesting from many counties in the southern part of the state, but it seems tolerably certain that in most, if not all, these cases Cooper's Hawk was mistaken for the present species.

We know of but two instances in which the eggs have been taken in the state, and for these we are indebted to Mr. Edward Arnold of Battle Creek He reports a nest with four eggs taken near Port Huron, St. Clair county, May 26 1899, the nest being placed twelve feet up in a cedar tree. Another nest, with two eggs, was taken May 22, 1901, from a cedar tree, also in St. Clair county. While these are the only actual records of nesting known to us, the bird has been found during the nesting season at several points in the northern part of the state; by Major Boies on Neebish Island, St. Mary's River; by O. B. Warren in Marquette county, 1898; and by the writer at Gaylord, Otsego county, and Grayling, Crawford county, in June, 1902, and on Beaver Island, Charlevoix county, in July, 1904.

While this species closely resembles Cooper's Hawk in flight, general appearance, and character of nesting, the eggs are heavily spotted, while those of Cooper's Hawk are never heavily spotted, and usually are plain bluish white without any spots at all.

Among 159 stomachs reported upon by Dr. Fisher, 6 contained poultry or game birds; 99, other birds; 6, mice; 5, insects; and 52 were empty. It appears, therefore, that out of 107 stomachs which contained food 99 contained remains of wild birds while only 6 contained mice (Hawks and Owls of the U. S., 1892, 35-37). These figures should be compared with those relating to other hawks, and especially to the owls.

The Sharp-shin is by no means a noisy hawk, except perhaps when its nest is threatened. At such times its shrill notes justify the description given by a farmer who said they were always "squealing" when he went near their nest. One writer says their call is a clear *chee-up, chee-up,* while another compares it to the *cac, cac, cac* of the Flicker, and says "it is exactly like that of the Cooper's Hawk, except perhaps a little shriller and not quite so loud" (Bendire, Life Hist. I, 188).

This is one of the species which frequently migrates in large scattered flocks, especially in autumn. Mr. P. A. Taverner observed such a flight in the autumn of 1905 at Point Pelee, Ont., about 20 miles east of Detroit. He writes: "There were Sharp-shins everwhere —sweeping about through the woods, beating about just over the tree tops; higher, working up and down the line of trees along the shore [Lake Erie], and still farther up, as high as one could see them, were still hawks. Standing in a small opening in the brush where I could look out over a field I counted 25 and I judged there were but an average number for the day in sight then." This flight

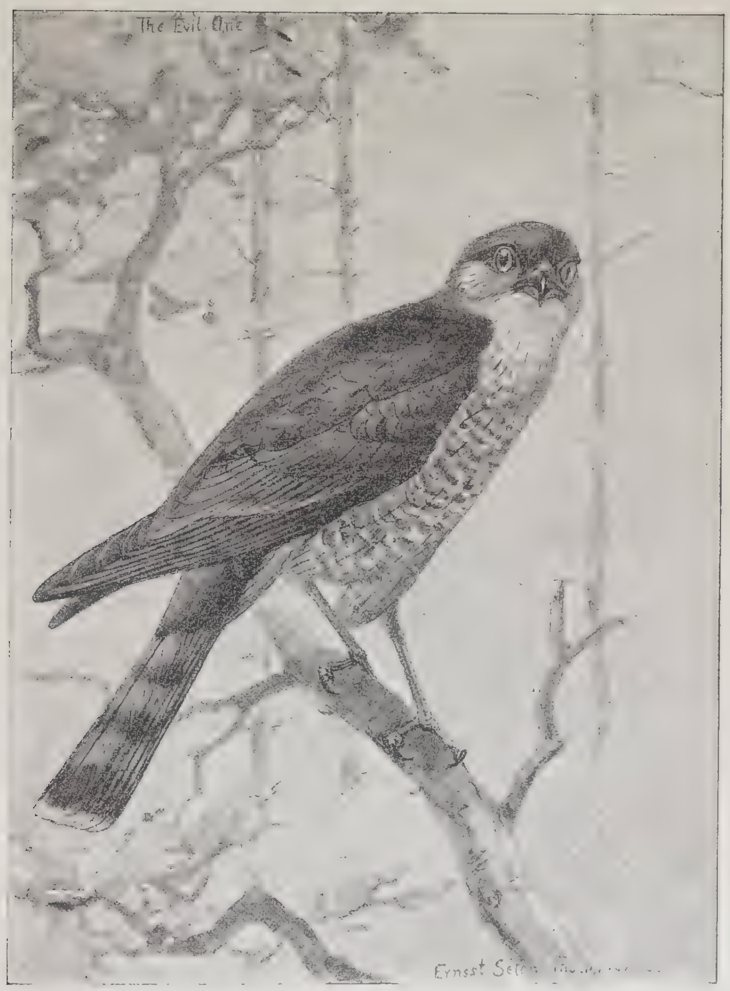

Plate XVIII. Sharp-shinned Hawk. Adult.

Reprinted from Chapman's Bird Life, by courtesy of D. Appleton & Co.

lasted several days and appears to take place late in August and early in September every year.

TECHNICAL DESCRIPTION.

Adult male: Uniform dark bluish gray or slate blue above, the feathers of the occiput pure white beneath the surface; under parts white, the throat narrowly streaked and the rest heavily barred with reddish brown; primaries blackish on outer webs, bluish white barred with black on inner webs, the five outer ones emarginate on the inner webs; tail colored like the back, but with about five blackish cross-bars, the tip narrowly white. Tail square or slightly emarginate at tip; bill black; legs and feet yellow; iris reddish brown. Length 10 to 11.50 inches; wing 6.10 to 7.10; tail 5.80 to 6.10. Adult female: Similar in color to the male, but decidedly larger. Length 12.50 to 14 inches; wing 7.80 to 8.80; tail 6.60 to 8.20. Immature: Without any slate blue, the upper parts brownish, the feathers mostly edged with rufous and the tertiaries and scapulars with many partly concealed, large, white spots; under parts white, everywhere streaked with pale brown, many feathers with sharp shaft lines of dark brown or blackish.

136. Cooper's Hawk. Accipiter cooperi (*Bonap.*). (333)

Synonyms: Pigeon Hawk, Chicken Hawk, Quail Hawk, Blue Darter, Swift Hawk.—Falco cooperii, Bonap., 1828.—Accipiter cooperi, Gray, 1844, and authors generally.—Astur cooperi, Jard., DeKay, and some others.—Nisus cooperi, B. B. & R., 1875.

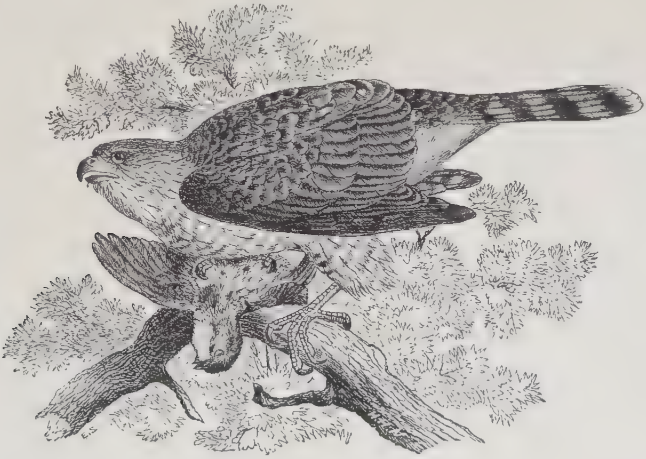

Fig. 70. Cooper's Hawk. Adult.

From Baird, Brewer & Ridgway's North American Birds. Little, Brown & Co.

Figures 70 and 71.

With nearly the same proportions as the Sharp-shinned Hawk, but averaging decidedly larger, with heavier legs and feet, and the tail rounded instead of square. In coloration the two are very similar, and there is the same general difference between adults and immature birds.

Distribution.—North America from southern British America south to southern Mexico. Breeds throughout its range.

Probably, all things considered, our most abundant hawk. It is found in all parts of the state, and in all seasons of the year, except during two or three of the coldest months. It nests everywhere throughout the state, and abundantly in most sections, placing the nest in almost any kind of tree and at heights varying from a dozen feet to nearly one hundred. The nest is commonly composed of sticks of various sizes, and lined with twigs and scale-like pieces of bark. Rarely does the nest contain any soft lining, although tufts of down from the old bird are often found clinging to the nest and when visible from below are often taken as proof that the nest is in use.

The period of incubation is about twenty-four days, and only a single brood is reared in a season. The eggs vary from two to six and are commonly bluish white or greenish white and unspotted, but occasionally some or all the eggs of a set are distinctly though faintly marked with spots of brown or gray. They average 1.93 by 1.50 inches, and may be laid at any time from late April to mid June, though most frequently in May.

This is the common "chicken hawk" of the farmers, and probably is responsible for most of the loss of small chickens. The bird has a habit of dashing suddenly among the poultry, picking up a small chicken in its claws, and carrying it away so quickly that it is commonly impossible to kill the robber. It is very likely to return the same day or the next and to repeat its visits indefinitely until killed. It also eats large numbers of wild birds, including some quail, young partridges and young waterfowl, and although it does some good by eating an occasional mouse or squirrel, it is nevertheless on the whole a decidedly injurious species. Out of 94 stomachs reported on by Dr. Fisher, 34 contained poultry or game birds; 52, other birds; 11, mammals; one, a frog; three, lizards; and two, insects.

Under the present Michigan law this species and the Sharp-shin are the only hawks which may be killed legally at any time; and the law seems to be a wise one, most of our other hawks being highly beneficial, and the few which form exceptions (as the Goshawk and Duck Hawk) being so rare as to be of no importance.

Unlike the buzzard hawks the Cooper's and Sharp-shin seldom wheel aloft on the lookout for food, but fly swiftly and silently from place to place, flapping the wings rapidly for a few seconds and then gliding noiselessly, always alert and watchful, and ever ready to drop like an arrow on some unsuspecting victim. Sometimes they alight for a few moments on the top of a dead tree, or on some other commanding perch, sitting quite stiff and upright, but soon taking wing again. They are among our most restless and active hawks, apparently endowed with a surplus of strength and energy and never content except when in action.

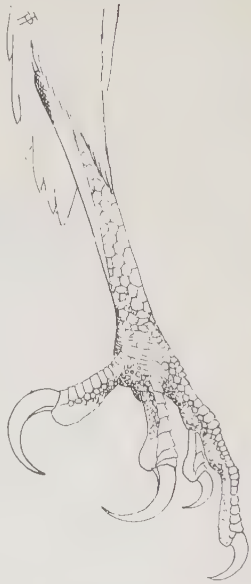

Fig. 71.
Left leg and foot of Cooper's Hawk. (Original.)

TECHNICAL DESCRIPTION.

Adult male: Top of head blackish or clear black, in strong contrast with the slate blue of the rest of the upper parts; feathers of occiput and nape pure white below the surface, the white showing when the feathers are ruffled; under parts white or nearly so, the chin and throat lightly streaked, the breast, belly and sides heavily barred, with reddish brown; primaries blackish on outer webs, the inner webs with broad and scanty bars of dusky and white; tail rounded, similar in color to back, and with four or five broad blackish bars and a narrow terminal edging of white. Bill black; cere, feet and legs yellow; iris reddish brown to deep red. Length 14 to 17 inches; wing 8.85 to 9.40; tail 7.80 to 8.30; tarsus 2.30 to 2.60.

Adult female: Similar to male, but duller, browner and decidedly larger. Length 18 to 20 inches; wing 10.10 to 11; tail 9 to 10.50; tarsus 2.60 to 2.85.

Immature: Similar to corresponding ages of the Sharp-shinned Hawk, but of course larger. Most hawks require several years for attaining fully adult plumage and almost any intermixture of young and adult plumage is possible.

137. Goshawk. Astur atricapillus atricapillus (*Wils.*). (334)

Synonyms: American Goshawk, Blue Hen Hawk, Blue Darter, Partridge Hawk, Dove Hawk.—Falco atricapillus, Wils., 1812.—Astur atricapillus, Bonap., 1838, Wils., Nutt., and others.—Astur palumbarius, Sw. & Rich.—Astur palumbarius var. atricapillus, B. B. & R., 1875.

With nearly the proportions of the two preceding species, but much larger than the largest, and far more heavily built. The immature bird closely resembles the immature Cooper's Hawk in all but size, but the adult, with the blue-gray upper parts and finely cross-barred gray and white underparts, is entirely unlike any other hawk.

Distribution.—Northern and eastern North America, south in winter to the middle states and southern Rocky Mountain region; casually west to Oregon. Breeding range restricted to the Canadian fauna of the United States and northward.

A magnificent but bloodthirsty bird with a particular fondness for game-birds, chickens, and doves, to which it is very destructive whenever it has a fair chance. Fortunately for the farmer it is seldom seen in Michigan except in severe weather when his poultry are generally well housed. Under such circumstances the Goshawk chases the doves, and in spite of their great powers of flight not infrequently captures them.

The great majority of specimens taken in the state are captured while trying to catch poultry or doves during severe cold weather Under normal conditions the Goshawk feeds principally upon grouse and other game birds, with an occasional rabbit or squirrel. Sometimes it is fairly common in winter in the northern half of the state, and then several winters may pass without any being observed. On the whole it must be considered a decidedly uncommon species.

About the middle of November, 1906, a large flight of Goshawks entered Michigan from the north and overspread the entire state. In the neighborhood of Detroit and especially in parts of western Ontario, they were particularly abundant, and a score or more of specimens were taken. One was taken at Morenci, Lenawee county, November 19, and one near Benton Harbor, Berrien county, about the same time. Mr. C. E. McAlvey informs me that about November 25, 1906, while hunting near Manistee, he shot a Partridge or Ruffed Grouse, and before he could recover it a large Goshawk darted down and carried it off. At about the same time a fine specimen was killed near Copemish, Manistee county, by Mr. H. A. Danville Jr. It is worthy of note that almost without exception the Goshawks of this flight seem to have been fully mature birds in the blue and white plumage, only a single immature bird having been taken. The entire time covered by this invasion did not exceed a month, and the birds disappeared as suddenly as they came.

It probably nests in the state regularly, but in very small numbers, and most of our records are far from satisfactory. Mr. A. B. Covert visited a nest near Comers' Camp, Wexford county, about six miles northwest of

Cadillac, April 22, 1882, and obtained the old female with one young and one egg. None of these specimens can be located at present, and although Dr. Gibbs examined the young bird when alive, June 26, 1882, he was not able to identify it positively. The location is one of the highest in the Lower Peninsula (about 1700 feet) and the surroundings precisely what one would expect for the summer home of the Goshawk.

Mr. S. E. White states (Birds of Mackinac Island, Auk, X, 1893, 223) that in 1889 two pairs of Goshawks could be seen about the island every day, but that he was unable to secure a specimen. In 1890 there was but one pair and the last pair had disappeared in 1891. There can be little doubt that these birds nested somewhere on the Island.

At the Fontinalis Club, near Vanderbilt, Otsego County, the writer found a pair of mounted Goshawks, July 28, 1909, which had been killed "a year or two before" by Mr. I. F. Sellick, the caretaker of the club. Early in the summer these hawks began carrying off his poultry, even taking full grown fowls. Finally, in June or July, the boy who drove the cows was attacked by one of the birds, which struck him on the head repeatedly and so frightened him that he refused to pass the place again. Mr. Sellick visited the place and was himself attacked. He located the nest "in the top of a dead stub, perhaps 30 or 40 feet from the ground." No nest was visible, but "the hen bird—at least the smallest one" was sitting in the top of this stub and evidently had eggs or young there. He shot this bird, and later secured the other when it returned to the nest. The nest itself was not examined. Mr. Sellick is positive that birds of the same kind nest in this vicinity every summer.

The Goshawk has been found nesting in the mountains of Pennsylvania and in southern New Hampshire, as well as in the Adirondack region of northern New York. We know of no reason why it should not nest regularly in elevated regions in Michigan where there is still plenty of timber.

The eggs are two or three, nearly white, sometimes faintly marked with brown, and average 2.31 by 1.74 inches.

TECHNICAL DESCRIPTION.

Adult: Bluish-gray or bluish-slate above, darkening to blackish or clear black on the head, where the feathers are snow-white beneath the surface; usually a broad white stripe above and behind the eye, bordered below by a stripe of slate-color or black; under parts white finely barred with gray, blue-gray or blackish, regularly on the flanks and thighs, irregularly elsewhere, and many of the feathers of throat and breast with narrow dark shaft streaks. Tail bluish-gray like the back, sometimes without any dark bars above, but usually showing four or five above, and these always conspicuous on the under side of tail. Bill and claws black; cere, legs and feet yellow; iris deep red. Immature: Grayish brown above, many feathers spotted, edged, or streaked with buff or white; lower parts buffy white, heavily streaked and spotted (but not barred) with brownish-black; tail grayish-brown with four or five dark crossbands, and a narrow white terminal edging.

Male: Length 22 inches; wing 12 to 13.25; tail 9.50 to 10.50; tarsus 2.70 to 3.05. Female: Length 24.50; wing 13.50 to 14.25; tail 11.50 to 12.75; tarsus same as in male.

138. Red-tailed Hawk. Buteo borealis borealis (*Gmel.*). (337)

Synonyms: Buzzard Hawk, Red-tailed Buzzard, Hen Hawk, Big Hen Hawk, Chicken Hawk, White-breasted Chicken Hawk, Eastern Redtail.—Falco borealis, Gmel., 1788, Wils., 1808, Nutt., 1840.—Buteo borealis, Vieill., 1819, and American authors generally.

Plate XIX and Figure 72.

When adult readily recognized by the large size and the general bright chestnut color of the tail with a narrow white tip and sometimes more or

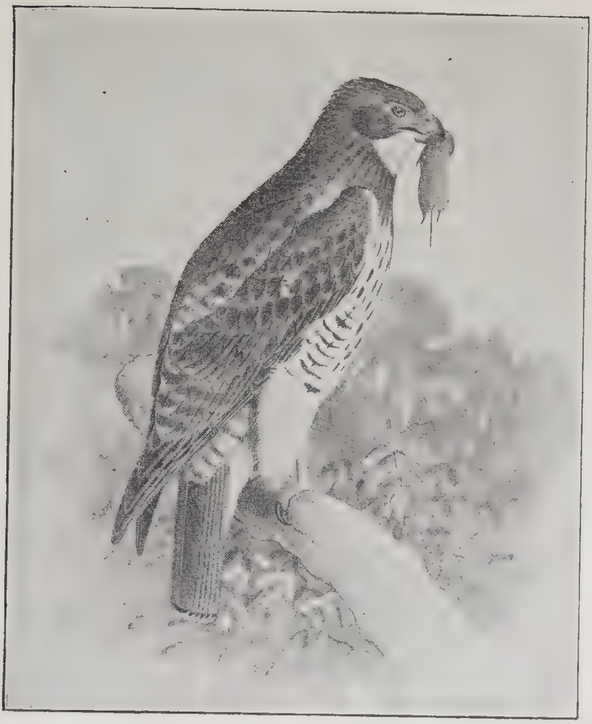

Plate XIX. Red-tailed Hawk. Adult.

From *North American Fauna* No. 16. Courtesy of Biological Survey, U. S. Dept. Agriculture.

less perfect black bar. The immature birds are readily confused with other species.

Distribution.—Eastern North America, west to the Great Plains, north to about latitude 60°, south to eastern Mexico. Breeds throughout most of its range.

This is one of the two most abundant buzzard hawks, commonly called Hen Hawks, often seen floating in circles or spirals far aloft, especially over the uplands. It seems to prefer open country, or at least regions not too heavily timbered, and its food consists almost entirely of meadow-mice, rats, ground squirrels, rabbits, and an occasional snake, frog, or fish. Like other hawks it sometimes gets into bad habits and may then visit the poultry yard many times in succession carrying away fowl after fowl unless trapped or shot. As a rule, however, it feeds almost entirely upon mammals and must be considered an extremely beneficial bird.

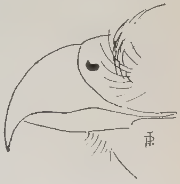

Fig. 72.
Bill of Red-tailed Hawk.

Out of 473 stomachs reported upon by Dr. A. K. Fisher, 54 contained poultry or game birds; 51, other birds; 278, mice; 131, other mammals; 37, batrachians or reptiles; 47, insects; 8, crayfish; 1, centipedes; and 13, offal. It is no uncommon thing to find the remains of 5 or 6 meadow-mice in a single stomach and in many localities during the fall and winter it feeds almost exclusively upon small rodents.

While wheeling high in the air its common call-note is "kee-aah" as written by Captain Bendire. While perched, often on the top of some tall and conspicuous tree, it is usually silent.

The nest is a bulky structure of sticks and twigs lined with smaller twigs and some bark, and usually a few feathers after the eggs are laid. It is placed high up in a large tree, sometimes in the thick woods but more often near the edges of wooded areas, or in single trees in the open. The eggs in Michigan are commonly two or three in number, but occasionally four are found. They are laid earlier than those of the Red-shouldered Hawk, often as early as the last week in March, and usually before the middle of April. Of thirty-one nests found by the late R. B. Westnedge, in Kalamazoo county, ten contained eggs the last week in March, thirteen between April first and 10th, seven during the rest of April, and only one in May (the 10th). The eggs vary much in color and markings, perhaps one-fourth of them being dirty white and unspotted, while the remainder are spotted and blotched, sparsely or thickly, faintly or heavily, in endless variation. They average 2.38 by 1.81 inches.

This hawk is rarely if ever found in Michigan in winter, but arrives from the south very early, usually before the middle of March, and remains until mid-October or later. Frequently it migrates southward in straggling flocks of considerable size, either wheeling in wide circles and drifting steadily southward, or alternately flapping and sailing, usually across the wind, and thus carried steadily to leeward. During fine weather in late autumn scores or even hundreds of Red-tails may be seen thus during a single day.

TECHNICAL DESCRIPTION.

Four outer primaries notched on inner webs. Adult: Dark brown above, more or less mixed or mottled with gray and whitish; under parts white or whitish, usually washed with buff on the sides of breast, only the belly streaked with dark brown or blackish; tail bright rust-red (rufous) above, usually with a distinct black bar near the end, the tip whitish; iris brown. Immature: Similar, but the dark streaks on the belly so thick as to form a broad zone or band of blackish, and the tail not rusty at all, but gray, crossed by about eight narrow blackish bands.

Male: Length 19 to 22.50 inches; wing, 13.50 to 16.50; tail, 8.50 to 10. Female: Length 23 to 25 inches; wing, 15.25 to 17.75; tail, 9.50 to 10.50.

139. Red-shouldered Hawk. Buteo lineatus lineatus (*Gmel.*). (339)

Synonyms: Red-shouldered Buzzard, Hen Hawk, Big Chicken Hawk, Winter Hawk. —Falco lineatus, Gmel., 1788, Wils., 1808, Aud., 1831.—Buteo lineatus, Jard., 1832, Aud., 1839, and others.—Falco hyemalis, Gmel., 1789, Bonap., 1832.—Falco buteoides, Nutt., 1832.

Plate XX and Figure 73.

Likely to be confounded only with the Red-tailed Hawk, and young birds of the two species can hardly be separated by the novice. The present species, however, always shows rusty-red shoulders (lesser wing-coverts), and the adult has a nearly black tail crossed by four or five distinct, narrow, pure white bars, and usually is tipped narrowly with white. The Red-shouldered Hawk is also more slightly built, the feet and legs in particular being more slender than those of the Red-tail.

Distribution.—Eastern North America to Manitoba and Nova Scotia; west to Texas and the Plains; south to the Gulf States and Mexico. Breeds throughout its range.

The Red-shouldered Hawk is an abundant hawk in Michigan, frequenting every part of the state and found, at least occasionally, at all seasons of the year. The greater number move southward at the approach of cold weather, but many remain all winter, at least in the southern half of the state. In its general habits it resembles the Red-tail rather closely, but is more partial to heavily wooded regions and less often seen at a distance from timber, or sitting motionless on the top of an isolated tree. This difference is correlated with its feeding habits, since the Red-shouldered Hawk is much more partial to the tree-loving squirrels, and more of its food comes from the woods than from the fields and meadows.

It is commonly called a Hen Hawk, and most farmers believe that it is a constant menace to the poultry yard. Nevertheless this idea is absolutely without foundation. Dr. A. K. Fisher says that in all his field experience he has never seen one attack a fowl, nor has he found the remains of one in the stomachs of those examined, except that in severe weather, when the ground is covered with snow and when food is scarce, it will devour dead chickens which have been thrown out from the yard, as well as other refuse found on the compost heaps or in the vicinity of slaughter-houses. Out of 206 stomachs reported on by Dr. Fisher, 3 contained some remains of poultry; 12, other birds; 102, mice; 40, other mammals; 20, reptiles; 39, batrachians; 92, insects; 16, spiders; 7, crayfish; 1, earthworms; and 3, fish. It will be seen from a careful examination of Dr. Fisher's report that the bird has a wide range in food and shows a decided preference for snakes and frogs, as well as a fondness for mice, grasshoppers, beetles, and various other insects. It does eat a few wild birds, but does not appear to be particularly injurious to game, although it occasionally picks up a quail.

Like the Red-tailed Hawk it is an early nester, though probably not quite so early as that bird. The late R. B. Westnedge records 21 sets of eggs taken in Kalamazoo county, of which number 16 sets (fresh eggs)

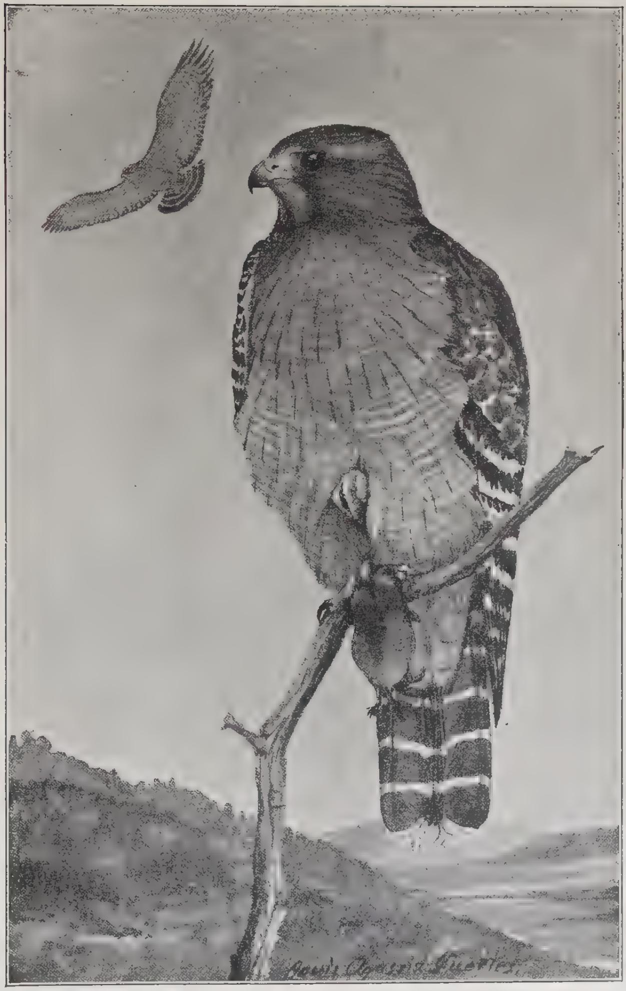

Plate XX. Red-shouldered Hawk. Adult.
Courtesy of National Committee of Audubon Societies.

were taken between April 1st and 15th, one set April 21st, one April 18th, two on May 5th and the latest one May 13th. The nests are similar to those of the Red-tail and we know of no way in which they can be surely discriminated. The eggs, however, average smaller and are more heavily spotted, with a smaller proportion of entirely unspotted eggs. The usual number of eggs is three, but four are often found. The ground color varies from white to pale brownish and they are variously spotted and splashed with brown of different shades. They average 2.13 by 1.69 inches.

It is difficult to discriminate between the call notes of this species and the Red-tail, and still more difficult to put the distinctions into words. Captain Bendire says "The note of early spring, especially in mating season, is 'kee-yooh, kee-yooh,' the last syllable drawn out," and Dr. Ralph says the call-note is "a loud whistle-like sound, resembling 'whee-ee-e,' with once in a while a 'ca-ac' added to or rather mixed with it" (Bendire, Life Histories, I, 222).

TECHNICAL DESCRIPTION.

Four outer primaries distinctly notched (emarginate) on inner webs, the outer webs spotted with white or buff.

Adult: Upper parts mottled with reddish brown and blackish, the feathers often with purplish reflections and sometimes tipped or margined with whitish; chin and throat white or whitish with a few narrow dark shaft-stripes; upper breast with similar streaks on a rusty ground, and more or less barred with white; lower breast, belly and sides regularly cross-barred with rusty and white, with a few longitudinal streaks of dark brown; under tail-coverts white and unspotted; shoulders (lesser wing-coverts) bright rust-red; tail black with about four narrow white cross bars, the white tip making a fifth bar; iris reddish brown. Immature: Upper parts similar, but with more numerous white edgings, the shoulders duller red; under parts creamy to buffy white with numerous rounded, tear-shaped or lance-shaped spots and streaks of brown, but with no trace of rusty and white bars; tail pale brown (often quite rusty on outer webs of feathers near the base) with a narrow white tip and about eight dark brown or blackish cross bars.

Male: Length, 17.50 to 19.50 inches; wing, 11.25 to 13.50; tail, 8 to 9.50. Female: Length, 19 to 22 inches; wing, 13.35 to 14.25; tail, 9 to 10.

140. Swainson's Hawk. Buteo swainsoni (*Bonap.*). (342)

Synonyms: Brown Hawk, Black Hawk, Hen Hawk.—Buteo swainsoni, Bonap., 1838, Coues, 1866.—Falco obsoletus, Gmel., 1789.—Buteo montanus, Nutt., 1833.

The adult in normal plumage is likely to be mistaken for the immature Red-tail or possibly for the Red-shouldered Hawk, but it lacks the rufous wing-coverts, and has a broad pectoral band of gray, brown, or cinnamon, separating the white throat from the nearly white belly. The fact that this hawk has only three primaries emarginate (cut out) on the inner webs will separate it from either of the two hawks just named.

Distribution.—Western North America from Wisconsin, Illinois, Arkansas and Texas to the Pacific and south to the Argentine Republic. Casual east to Maine and Massachusetts. Breeds nearly throughout its range.

Swainson's Hawk is a western bird which straggles eastward occasionally, specimens having been taken in many of the eastern states. It has been reported from Michigan a dozen times or more, but it seems probable that in most cases the birds so reported have been improperly identified; at all events in several instances specimens labelled and reported as Swainson's Hawk have been examined and proved to be Red-shouldered or Red-tailed Hawks. There are but two unquestionable records for the state, so far as we now know. The first is a specimen taken by Norman A. Wood, in Cheboygan county, in October 1883, and recorded in the Auk, Vol. XIV, 1897, p. 216. This specimen is now in the University Museum, Ann Arbor (Catal. No. 36062), and is an immature bird, in the black phase of plumage. The bird was not sexed when skinned, but its size would indicate a male. The second record is that of a specimen taken at Hessel, Mich., about 18 miles from Mackinaw City, October 13, 1908, and now in the collection of P. A. Taverner (Auk, XXVI, 1909, p. 83).

Specimens were reported from Kent county, Mich., by C. W. Gunn, in November 1882, but examination of the Gunn collection, now in the Kent Scientific Museum at Grand Rapids, reveals but three specimens, marked *B. swainsonii*, two of which are from California and one from Kent county, but all are Red-tailed Hawks without question. We are convinced that the determinations in most cases have been based solely upon color and pattern of plumage without comparison with genuine specimens of *swainsonii*, and without an examination of the primaries to see whether three or four were emarginate.

Several specimens were reported by W. A. Davidson, in January 1897, as killed in Wayne county; one was recorded by Dr. Miles as killed in Genesee county in the summer of 1859, probably the one mentioned by Stockwell in the Forest and Stream list. Covert reported it breeding in Washtenaw county, taking the female and eggs May 5, 1880. A. H. Boies informed Dr. Gibbs that he took a specimen at Hudson, Mich., about the first of November 1879. Mr. Covert also records a specimen taken by himself in Cadillac, August 16, 1882. Major Boies recorded a specimen taken on Neebish Island in October of either 1892, 1893, or 1894 (Bull. Mich. Orn. Club, I, 27). With the exception of the Kent county specimens in the Gunn collection, we have been unable to examine any of the birds mentioned above but have ascertained from inquiry that most of them were sold, exchanged, or given away, and so lost track of. It is by no means impossible that some of these were genuine Swainson's Hawks, but we feel no certainty that this was the case.

McIlwraith (Birds of Ontario, 1894, p. 204) records a young specimen observed at Hamilton in 1865, and another in the hands of a local taxidermist in 1886 but these identifications are open to some question. In Wisconsin it is far from common. According to Kumlien and Hollister (Birds of Wisconsin, p. 64) it has been "noted only during the autumnal migrations, but probably occurs more frequently along the Mississippi River than in the eastern or central parts of the state."

On the plains west of the Mississippi it is a common species and feeds principally on small mammals and insects, rarely attacking birds, and never poultry. It has been known to feed almost exclusively on grasshoppers for many days at a time, and when these insects are extraordinarily abundant the Swainson's Hawks gather in large numbers to feast upon them. This is one of the species also which frequently moves southward in large straggling flocks during the fall, although it seems probable that many, if not all, our common hawks frequently associate in flocks during migration.

The eggs are from two to four, their ground color greenish white to yellowish white, commonly spotted with different shades of brown and gray, but not often heavily marked. They average 2.23 by 1.73 inches.

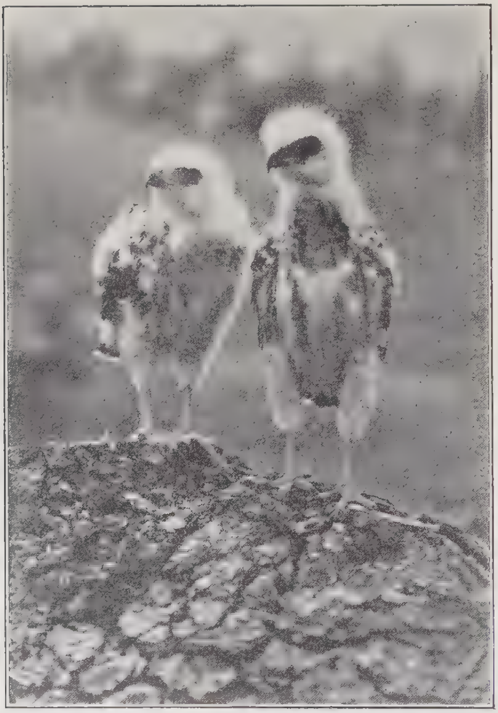

Plate XXI. Broad-winged Hawk. Young, 24 days old.
From Bird Lore. Courtesy of Dr. Thomas H. Jackson.

TECHNICAL DESCRIPTION.

"Only three outer quills [primaries] with inner webs distinctly emarginated. Tail grayish brown, or brownish gray, sometimes with a hoary tinge, crossed by an indefinite number (about 9 or 10) of narrow dusky bands, which toward base of tail become gradually indistinct and finally obsolete.

"*Adult male, normal plumage:* Above nearly uniform grayish brown; forehead, chin, and throat white, usually abruptly defined and forming a distinct patch; chest and upper part of breast usually plain rufous or cinnamon (rarely mixed or broken with whitish); rest of lower parts buffy whitish, sometimes immaculate, but usually more or less barred or spotted with brownish; length 19.50 to 20 inches; extent 48 to 50.50; weight 1½ to 2¼ pounds; wing 14.40 to 16; tail 8 to 9; culmen .80 to .90. *Adult female, normal plumage:* Similar to the male, but chest patch grayish brown instead of rufous or cinnamon; length 21 to 22 inches; extent 50.50 to 56; weight 2¼ to 3½ pounds; wing 14.75 to 17.25; tail 9 to 10; culmen .80 to .95. *Melanistic phase, both sexes:* Whole plumage uniform sooty brown, the under tail coverts sometimes spotted or barred with rusty or whitish. (In different individuals may be seen every possible intermediate condition of plumage between this complete melanism and the light-colored normal plumage described above). *Young:* Tail as in adult; above blackish brown varied with buffy or ochraceous; head, neck, and lower parts creamy buff (deeper in younger, paler in older individuals), the lower parts usually more or less spotted with blackish, the head and neck streaked with same" (Ridgway).

141. Broad-winged Hawk. Buteo platypterus (*Vieill.*). (343)

Synonyms: Broad-winged Buzzard.—Sparvius platypterus, Vieill., 1823.—Falco pennsylvanicus, Wils., 1812, Aud., 1831.—Buteo pennsylvanicus, Bonap., 1830, and many others.—Buteo latissimus, A. O. U. Check-list, 1889, and most subsequent authors.

Plate XXI.

Decidedly smaller than any of the other buzzard hawks, the wing not more than 13½ inches. It resembles the immature Red-shouldered Hawk somewhat, but may always be known by the small size coupled with but three emarginate primaries.

Distribution.—Eastern North America from New Brunswick and the Saskatchewan region to Texas, Mexico, and thence southward to Northern South America and the West Indies. Breeds throughout its United States range.

In most parts of Michigan this is not an abundant bird, but it is more common in the northern half of the state, where it is a summer resident and breeds. It is so frequently confounded with the other Buteos that our reliable records are not very numerous, and it is possible that it nests much farther south than we now suppose. Mr. Edward Arnold of Battle Creek has a set of two eggs of this species taken in Kalamazoo county, May 24, 1875, by Dr. Morris Gibbs. The nest was in a black ash tree and said to have been about 100 feet from the ground. According to Dr. Gibbs the late Richard Westnedge of Kalamazoo, took several nests in Allegan county, in heavy woods along the Kalamazoo River, but after careful examination of Mr. Westnedge's catalogue of eggs, kindly sent me by his mother, I am unable to find any records for this species. The late Percy Selous found it at Greenville, Montcalm county, in June, and it doubtless nests there. We have found it nesting in Emmet county, near Harbor Springs, and it has also been recorded from the same region by Otto Widmann. S. E. White reported it from Mackinac Island, and Major Boies from Neebish Island, St. Mary's River. According to B. H. Swales it is an abundant migrant in southeastern Michigan and breeds there, at least occasionally. He took a nest of three eggs, together with the parent bird, near Highland

Park, Wayne county, April 29, 1893. The nest was 55 feet up in a beech tree. Mr. Swales also states that this species is fairly abundant in St. Clair county and is known to breed.

In its general habits it somewhat resembles the other Buteos but its food consists more largely of insects and it is entirely free from suspicion of injury to the farmer. It eats mice, squirrels, ground squirrels, rats, shrews, wood mice, as well as grasshoppers, crickets, beetles, and the large, green, naked caterpillars which are the larvæ of destructive moths. Out of 38 stomachs reported on by Dr. Fisher, 2 contained small birds; 15, mice; 13, other mammals; 11, reptiles; 13, batrachians; 30, insects; 2, earthworms; and 4, crayfish.

The Broadwing nests always in trees, the nest being made ordinarily of sticks and lined with thin scales of dry bark but not infrequently green leaves are added, possibly for protection during the absence of the parents. The eggs are commonly two or three, very rarely four, the ground color grayish white, spotted in variable degrees with brown or gray. They average 1.93 by 1.56 inches.

This is another of our hawks which often migrates in flocks, and sometimes hundreds may be seen passing slowly northward in spring, or southward in fall, now flapping steadily, and again circling and drifting slowly in the desired direction. The autumn migration takes place mostly between the middle of September and the 10th of Otcober, and the birds return from the south early in April.

TECHNICAL DESCRIPTION.

Only three outer primaries notched (emarginate) on the inner webs; wing never more than 13.50 inches long.

Adult: Upper parts grayish brown to brownish black, darkest on interscapulars and crown, often with distinct purplish reflections; forehead and chin whitish, the latter sometimes streaked with dusky, sometimes pure white; feathers of occiput pure white below the surface; underparts reddish brown, everywhere spotted or barred with white, most freely and regularly on the belly, flanks and thighs (tibiæ), least on the chest; sides of neck without white, but usually with a blackish patch from corner of mouth backward; tail brownish black to clear black above, with 2 to 4 distinct, wide cross-bars of white or grayish, and a narrow tip of the same shade; iris, cere and feet yellow. Immature: Upper parts almost precisely like those of the young Red-shouldered Hawk, but the shoulders not rusty, nor the outer webs of the primaries light-spotted; under parts pure white to buffy white, more or less heavily spotted and streaked with dark brown, but without bars except imperfect ones on flanks and thighs; chin and throat usually pure white, with few or no streaks; iris bright yellow; cere and feet greenish yellow.

Male: Length, 13.25 to 15 inches; wing, 9.85 to 10.70; tail, 6.50 to 7. Female: Length, 16 to 18 inches; wing, 11 to 11.40; tail, 7 to 8.

142. Rough-legged Hawk. Archibuteo lagopus sancti-johannis (*Gmel.*). (347a)

Synonyms: American Rough-legged Hawk, Rough-legged Buzzard, Black Hawk, Mouse Hawk. —Falco sancti-johannis, Gmel., 1788. -Buteo sancti-johannis, Nutt., 1833. —Falco lagopus, Wils., 1808.—Buteo lagopus, Rich., 1831.

Known from all the rest of our hawks by the feathered shank or tarsus, only the toes being naked. It is about the size of the Red-tailed Hawk, but a much lighter built bird, with more slender feet, weaker bill, and especially longer, more pointed wings. Its plumage is too variable for ready description, but nearly black individuals are rather common, and in specimens not so colored a broad dark zone across the lower breast and belly is usual.

Distribution.—North America north of Mexico, breeding north of the United States (except in Alaska).

This is a beautiful and valuable hawk, which is found with us only during the colder half of the year, passing beyond our northern boundary to nest. It arrives from the north usually in October or November and in favorable seasons and localities some may winter, but the majority pass farther south after the streams and lakes freeze up. It returns in the spring with the disappearance of snow, and a few linger until the first week in May (Greenville, May 4, 1898, Selous).

Dr. Atkins, of Locke, reported it as breeding there (O. & O. IX, 44), but this was certainly an error. No unquestionable instance of its nesting within the borders of the United States (except in Alaska) has been recorded. and the numerous reports of its nesting in Maine, Wisconsin, and Minnesota have all been discredited. A single credible record is that of a nest and two eggs found in Nelson county, North Dakota, June 7, 1901, by Mr. A. C. Bent (Auk, XVIII, 393); the bird, however, was not killed in this case, and although the collector of the eggs was positive of the identification, there is still room for question. It nests in Labrador on ledges, cliffs, etc., and in Alaska mainly in trees, 20 feet or more above the ground, but occasionally on banks, bluffs and cliffs. It lays from two to five eggs (usually three or four) which are dingy white, sometimes plain, but oftener spotted and blotched with various shades of brown and gray in every conceivable degree and pattern. They average 2.31 by 1.74 inches.

While with us in spring and fall this hawk frequents by preference open, low lying lands and marshes, where it perches on the tops of scattered trees watching for its prey, which consists almost entirely of meadow-mice, and frogs. In favorable situations, where such food is abundant, the birds sometimes gather in considerable numbers, so that sometimes 30 or 40 may be seen in the course of a week and a large number may be shot during the season. This has happened several times at the St. Clair Flats and in the marshes bordering Lake St. Clair and the Detroit River. The Rough-leg is irregular in its visits, some years appearing in considerable numbers and during other years none being seen. It does absolutely no harm to the farmer and should be rigidly protected.

TECHNICAL DESCRIPTION.

Entire leg feathered to base of toes; basal half or more of tail white or whitish, the remainder dark, four outer primaries emarginate on inner web.

Normal Adult: Plumage too variable for description, but the above points are sufficient if the specimen is in hand. In addition, there is usually a broad dark zone across the lower breast and belly, sometimes solid fuscous or black, sometimes made up of a more or less fused mass of spots, streaks and bars. The latter condition is said to characterize older birds, while the solid dark zone indicates immaturity. As a rule the upper parts closely resemble those of the Red-tail, although the head and neck average lighter colored. A dark phase (melanistic) is not uncommon, in which the entire bird is black or blackish except the forehead, base of tail and inner webs of primaries, which are white. Intermediate stages are also common.

Male: Length 19.50 to 22 inches; wing 15.75 to 16.80; tail 9 to 10. Female: Length 21.50 to 23.50 inches; wing 16 to 18; tail 9 to 11.

143. Golden Eagle. Aquila chrysaetos (*Linn.*). (349)

Synonyms: Brown Eagle, Gray Eagle, Black Eagle, Ring-tailed Eagle.—Falco chrysaëtos, Linn., 1758.—Falco canadensis, Linn., 1766.—Aquila canadensis, Wils., 1808.—Aquila chrysaëtos, Sw. & Rich., 1831.—Aquila fulva, Nutt., 1833.—Aquila chrysaëtus var. canadensis, B. B. & R., 1875.

Plate XXII and Figure 74.

Its size, the expanse of wings being about seven feet, prevents confusion with any other bird except the Bald Eagle. and the two may be separated in any plumage by examination of shanks or tarsi. In the Golden Eagle these are feathered to the base of the toes (Fig. 74), much as in the Rough-legged Hawk, while in the Bald Eagle the shanks are naked for some distance up the legs. Of course the adult Bald Eagle always has the pure white head and tail, which the Golden Eagle always lacks, but the immature birds resemble each other sufficiently to be readily confused.

Distribution.—North America, south to Mexico, and northern parts of the Old World. Breeding range in the United States practically restricted to the mountainous parts of unsettled regions.

While the Golden Eagle is generally considered a rare bird anywhere it would seem to be fully as common in winter in Michigan as the Bald Eagle. Probably it would not be true of all localities but neither bird is *abundant* anywhere and the Golden Eagle occurs here and there through the state almost every winter. Naturally it is entirely absent during the warmer half of the year and almost all our records for the state fall within the months December, January, and February. However, there are some records for November and March and a few for October.

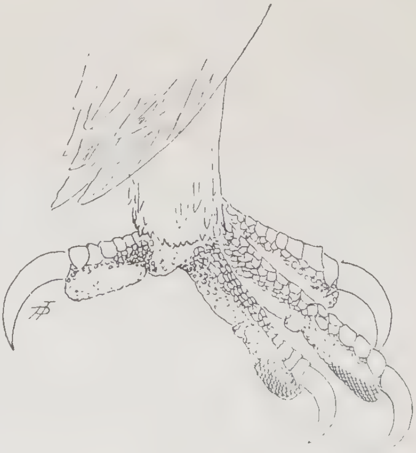

Fig. 74. Right foot of Golden Eagle. (Original.)

In at least three instances we have known Golden Eagles to be caught alive in the hands after becoming entangled in bushes and vines where evidently they had plunged after some quarry which they had failed to capture. In other cases specimens have been caught in steel traps while feeding on carrion during severe weather. This is contrary to their usual habits, since the Golden Eagle is much more particular than the Bald Eagle to have its food perfectly fresh. One which we kept in captivity at the College for more than a year absolutely refused to eat tainted meat or any animal which had begun to decompose.

The habitual food consists of partridges, quail, water fowl, rabbits, and occasionally squirrels and even smaller game. It does not seem to care for fish and is no more abundant along the lake shores than in the interior, except possibly that it follows the migration routes of water birds. It is not known to nest within our limits, the several reported instances for

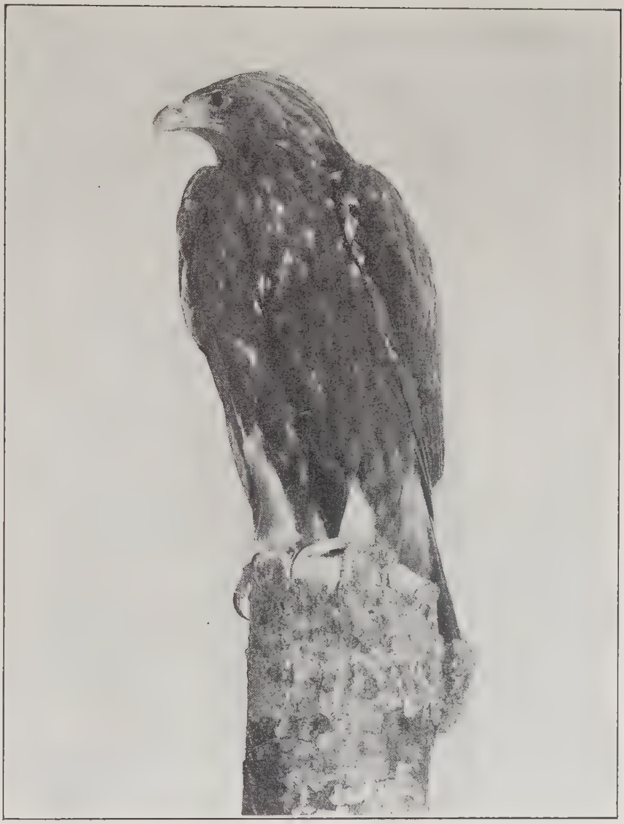

Plate XXII. Golden Eagle. Adult.

From photograph of mounted specimen. (Original.)

Michigan being all referable to the Bald Eagle, with which the bird is constantly confounded.

Most people, including many who should be better informed, consider any eagle which lacks the white head and tail a Golden Eagle, whereas the Bald Eagle does not acquire the white head and tail until the third or fourth year at least, yet probably nests when one year old, that is, during the second summer.

Dr. R. H. Wolcott states that a nest believed to be that of a Golden Eagle was described to him in 1894, on the shore of Lake Huron, 40 miles east of Mackinac. Mr. Ed. Van Winkle of Van's Harbor, Delta county, Mich., was positive that the Golden Eagle nested in Delta county some ten or twelve years ago, but he was doubtless mistaken. Of course it is not impossible that the bird does sometimes nest among the cliffs along the south shore of Lake Superior, but we have absolutely no proof that such is the case. This is decidedly a mountain eagle and its nests are usually placed in almost inaccessible places on cliffs. It is known, however, to nest in trees occasionally, and in some regions (California and Oregon) most of the nests are so placed.

Usually but two eggs are laid, though there are records of three. They are deposited very early in the season, in January or February in Arizona, from the 10th to the 20th of March in southern California, and from April 1st to April 10th in southern Oregon. We have no records of nests from the vicinity of Michigan. The eggs are sometimes plain white, but oftener thickly spotted or blotched with brown or gray, various shades of brown predominating. They average 2.93 by 2.34 inches.

The Golden Eagle sometimes attacks larger animals than hares and rabbits, and occasionally, on some of the western sheep ranches, it is quite destructive to young lambs. Probably also once in a while it attacks young fawns of the common deer, but the instances are rare.

Major Bendire says of its note "The usual call-note is a shrill 'kee-kee-kee' uttered in a high tone. It is often heard in the early spring before nidification commences. Another note not so frequently used—one of alarm—is 'kiah-kiah,' repeated a number of times."

The Golden Eagle rears but one brood in a season, and the period of incubation is approximately four weeks.

TECHNICAL DESCRIPTION.

Adult: General color rich dark brown, lighter on tibiæ and tarsi, the feathers of the occiput and hind neck with separate, lanceolate tips (like the hackles of a rooster) which are yellower or more golden brown, whence the name of the eagle; tail white basally, only the terminal half or less clear black, sometimes with a lighter tip; cere and feet greenish yellow; bill dark horn color; iris brown.

Immature: Similar to adult, but darker, especially above, the hackles less golden, and the tail white only at the very base, or with several imperfect grayish bars on its basal half.

Male: Length 30 to 35 inches; wing 23 to 24.70; tail 14 to 15. Female: Length 35 to 40 inches; wing 25 to 27; tail 15 to 16; extent of spread wings 7 to 7½ feet.

144. Bald Eagle. Haliæetus leucocephalus leucocephalus (*Linn.*). (352)

Synonyms: White-headed Eagle, American Eagle, Black Eagle, Gray Eagle, Washington Eagle.—Falco leucocephalus, Linn., 1766, Gmel., Lath., Wils.—Aquila leucocephala, Briss., Vieill., Swains.—Haliaëtus leucocephalus of authors generally.

Only two species of eagle occur in Michigan; the Golden Eagle has just been described, the Bald Eagle when adult has a pure white head and tail which readily identify it. Immature birds, lack these distinguishing marks and are readily confused with the Golden Eagle. They may be known always, however, by the partly bare shank or tarsus, coupled of course with the large size the spread of wing being from six to seven feet, averaging a little less than that of the Golden Eagle.

Distribution.—"United States to Southern Lower California and northern Mexico, breeding in suitable locations throughout its range" (A. O. U. Check List, 1910).*

The Bald Eagle is generally distributed over the state, but is most commonly seen near the shores of the Great Lakes, or along the larger rivers, and is nowhere abundant. Its food consists very largely of fish and it seldom or never nests at any great distance from some region where this food can be obtained in abundance. It seems to be resident, or practically so, wherever found and if it absents itself at all it is only for a short time during the coldest weather when the waters on which it depends so largely for its food are tightly frozen.

It was formerly much more abundant, and probably a few pairs nested in every county in the state, but the birds are followed relentlessly by hunters who shoot them for specimens or for mere sport, and the nests have been robbed year after year by egg collectors, so that one by one the nests have been deserted and the birds have withdrawn to places of greater security. It is much to be regretted that this wanton destruction has been permitted, and it is a matter of congratulation that by an act of the legislature of 1905, renewed at each subsequent session, these noble birds are protected together with other non-game birds, and their destruction or the disturbance of their nests at any time of year becomes an offense punishable by fine and imprisonment.

Although this is one of the largest of our birds of prey, and has been chosen as the emblem of the Republic, it is nevertheless a robber of a rather disgraceful type, and although it frequently captures worthy prey, in open fight or by direct attack, it often robs the Fish Hawk, compelling it to relinquish the fish which it has just captured. When nothing better offers it feeds freely upon decomposing fish washed up along the shore, or upon carrion, in company with the Crow and Raven. True, it kills many rabbits, grouse, ducks and water fowl of various kinds, and even stoops to squirrels, mice and snakes; but on the whole it confers no decided benefits on the agriculturist, although on the other hand, it is not commonly injurious. On rare occasions it picks up a hen, usually at a distance from the house, and in early spring it has been known to destroy young lambs, but these are not common offenses.

The nest is very bulky and conspicuous, placed high up in a large tree (often a dead one), and often so situated as to command a wide view of the surrounding country. It is occupied year after year by the same pair of eagles and is only slightly repaired each spring before the laying of eggs. This takes place quite early in the season, in December or January in Florida, and from February to March in the middle states. It is likely that the exact time of egg laying varies with different pairs and in different seasons, but in Michigan the eggs probably are laid in the latter part of March or the first of April. But a single brood is reared in a season and the period of incubation is about thirty days. The eggs are commonly two, very rarely three; pure white in color (unless nest-stained), and average 3 by 2.30 inches

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*For notes on the Northern Bald Eagle, see Appendix.

It is a well known fact that in most birds of prey the female exceeds the male in size, and this is true of both species of eagle. It is not so generally known, however, that the young Bald Eagle, during the first year after leaving the nest, is larger than either of its parents, the expanse of wing being often a foot greater. It is also noticeably different in color, and these large, immature birds were originally described by Audubon as the "Bird of Washington," and even at present we sometimes hear allusions to the "Washington Eagle" as if it were a distinct species.

TECHNICAL DESCRIPTION.

Tarsus bare for an inch or more above base of toes; five outer primaries deeply notched (emarginate) on inner webs.

Adult: Entire head, neck, upper tail-coverts and tail pure white, in strong contrast with the rest of the plumage which is mainly dark brown, many of the body feathers with paler margins, and the wing feathers nearly black. Bill, cere and feet bright yellow; iris pale yellow to yellowish white.

Immature, first year (Black Eagle): Plumage mainly black; no white on head, and at most only small freckles of white on the inner webs of tail feathers, but all the body feathers snowy white below the surface; bill black; feet yellow; iris brown.

Immature, second and third year (Gray Eagle); Head and neck mainly black, the "hackles" of hind neck tipped with brown or gray; tail black, the inner webs of most of the feathers more or less sprinkled or mottled with whitish; body feathers above and below mixed brown, black and gray, or even streaked and margined with pure white. Bill dark horn color; iris brown; cere and feet yellow.

Male: Length 30 to 35 inches; wing 20 to 26; tail 11 to 15.25. Female; Length 34 to 43 inches; wing 23.50 to 28; tail 12.50 to 16; spread of wings 6½ to 7¾ feet.

Family 38. FALCONIDÆ. The Falcons.

145. Duck Hawk. Falco peregrinus anatum (*Bonap.*). (356a)

Synonyms: Peregrine Falcon, American Peregrine, Great-footed Hawk.—Falco anatum, Bonap., 1838.—Falco peregrinus, Ord, 1808.—Falco communis var., Lath.—Falco communis var. anatum, B. B. & R., 1875.

This is a large falcon characterized by the notched and toothed bill, and the single emarginate outer primary; only to be confounded with the Gyrfalcon (Appendix).

Distribution.—North America at large, and south to Chili. Breeds locally throughout most of its United States range.

This beautiful falcon is nowhere common; although a few individuals are seen each season in favorable localities it probably would be impossible for any collector to procure one on an order at any particular time. It is most often seen during the large flights of water fowl in spring and fall, when it seems to accompany these birds in their migratory movements, feeding upon them whenever so inclined. Specimens are found here and there in the public and private collections of the state, but in most cases without definite data as to time and place of collection. Among the more recent records are a female shot March 25, 1904, on the outskirts of Detroit, and a male taken October 6, 1904, on the Detroit River near Pt. Mouille (Swales, Wilson Bull. 53, 1905, p. 108); an immature bird taken by N. A. Wood at the Charity Islands, Saginaw Bay, September 20, 1910, and a second specimen at the same place October 3.

In general appearance and habits it is practically identical with the Peregrine of the Old World, which was considered the prince of falcons, or "noble hawks" by the sportsmen of the middle ages and more recent times who devoted much of their time to hawking. It kills its game either by direct chase, sudden assault, or, more commonly, by rising in a spiral until it gets above its victim and then dropping with unerring precision upon it.

Sometimes it nests upon a lofty tree, but its favorite aerie is the inaccessible ledge of some cliff, where it builds a nest of sticks and twigs and rears its young in perfect safety. Such a nesting place, the only one known to us in Michigan, was located on the south shore of Lake Superior in the summer of 1906, by Mr. E. A. Doolittle, who found the young, full-fledged and very noisy, early in July. Among the remnants of food brought for the young was found the entire foot and part of the skeleton of a Long-eared Owl.

It lays three or four buffy or deep brown eggs, sometimes nearly uniform in color, but more often heavily spotted and blotched with several shades of brown. They average 2.10 by 1.60 inches.

Mr. Robert Ridgway describes three nests of this species found near Mt. Carmel, Ill., in the spring of 1878. All were placed in cavities in the tops of very large sycamore trees, and were inaccessible. One tree was felled and the measured distance from the ground to the nest was 89 feet. The eggs in Indiana and Illinois are deposited in April or May; probably somewhat later in our latitude. As with most other large hawks the period of incubation is about four weeks, and but one brood is reared each year.

This falcon feeds almost entirely upon large birds, particularly grouse, partridges, and water fowl. It is decidedly fond of poultry, and were it more common doubtless would prove quite a pest to the farmer. As it is, not one Michigan farm in a thousand is visited by this bird in the course of a lifetime.

TECHNICAL DESCRIPTION.

Upper mandible not simply hooked, but with an additional point or "tooth" near the tip and a corresponding notch in the lower mandible; first and second primaries longest and about the same length, only the first distinctly emarginate, on inner web.

Adult: Top and sides of head very dark slate or black, the back similar but paler; chin, throat and chest white or buffy white, without dark markings, or with a few narrow shaft-streaks, but the lower breast, sides and belly sharply barred with black; wings and tail blackish closely barred with lighter, mainly on inner webs of feathers. Bill bluish black; iris brown; cere and feet yellow. Immature: Similar above, but most feathers with light edgings; underparts much more buffy and heavily streaked (not barred) with brown or blackish.

Male: Length 15.50 to 18 inches; wing 11.30 to 13; tail 6 to 7.50. Female: Length 18 to 20 inches; wing 13 to 14.75; tail 6.90 to 9.

146. Pigeon Hawk. Falco columbarius columbarius *Linn.* (357)

Synonyms: Pigeon Falcon, American Merlin, Bullet Hawk.—Falco columbarius, Linn., 1758, and authors generally. Lithofalco columbarius, Bonap., 1850.—Æsalon columbarius, Kaup., 1850.—Falco (Æsalon) lithofalco, B. B. & R., 1875.

A medium sized falcon, smaller than the Duck Hawk and larger than the Sparrow Hawk, with the two outer primaries emarginate on the inner web. In color it most closely resembles the Sharp-shinned Hawk, but is more heavily built, with shorter tail, more pointed wings, and above all, the typical falcon bill.

Distribution. The whole of North America, south to West Indies and northern South America. Breeds chiefly north of the United States.

This dainty little falcon is one of the less common hawks, and although it has been recorded from all parts of the state (mainly as a migrant) it is never abundant and many a collector has spent several seasons in the field without even seeing one. So seldom is it met with, and so generally is it confounded with other small hawks, that the notes from our correspondents are of little value in determining its habits. Like the Duck Hawk and the Sharp-shin it feeds much upon birds, and thus should be considered rather an injurious hawk; yet its scarcity saves it from this reproach. Of 51 stomachs reported upon by Dr. A. K. Fisher, 2 contained poultry; 41, small birds; 2, mice; and 16, insects.

We do not know that its nest has ever been taken in Michigan. The nearest approach to it is the fact that an adult and three young (able to fly) were seen, and two of the young taken, by a member of the University of Michigan party at the Porcupine Mountains, in Ontonagon county, July 24, 1904. It would seem extremely probable that these young were reared in that immediate vicinity. The same party afterward (Aug. 23, 1904) saw several, and took three, on Isle Royale in Lake Superior. Mr. Norman A. Wood noted ten individuals at the Charity Islands, Saginaw Bay, during the fall migration, 1910, from August 30 to October 10, and took several specimens. Major Boies found it frequently on Neebish Island, in the St. Mary's River, during summer, and had no doubt that it bred there.

In the far north (Alaska and the Anderson River country), according to Major Bendire, it nests in May or June, placing its nest in hollows of trees or on the limbs, as well as frequently on the ledges of cliffs. The eggs, two to four in number, are soiled white or buffy, more or less heavily spotted with brown and cinnamon, and average 1.59 by 1.23 inches.

TECHNICAL DESCRIPTION.

Bill of the falcon type, with tooth and notch; second and third primaries longest and about equal, only the first and second emarginate on inner web; middle tail feathers with not more than four dark and five light bands.

Adult male: Above, bluish-gray with black shaft-stripes, and much rusty and white about the back of neck; under parts buffy, thickly striped with brown or black; inner webs of primaries with numerous (6 to 8) light bars or spots; tail mainly black, crossed by four narrow whitish or buffy bands and narrowly tipped with same color; bill horn-colored; cere and feet greenish-yellow; iris brown.

Adult female and young: Similar, but brownish above, with less white on the hind neck; the under parts less rusty than in the adult male.

Male: Length 10 to 11 inches; wing 7.40 to 7.80; tail 4.65 to 5.20. Female: Length 12.50 to 13.25 inches; wing 8.35 to 8.60; tail 5.30 to 5.50.

147. Sparrow Hawk. Falco sparverius sparverius *Linn.* (360)

Synonyms: American Sparrow Hawk, Rusty-crowned Falcon, American Kestrel, Mouse Hawk.—Falco sparverius, Linn., 1758, and authors generally.—Tinnunculus sparverius, Vieill.—Falco (Tinnunculus) sparverius var. sparverius, B. B. & R., 1875.

Plate XXIII and Figure 75.

The typical falcon bill, small size, and rust-red color suffice to identify this bird. A glance at Plate XXIII probably will serve the same purpose.

Distribution.—North America east of the Rocky Mountains, and from Great Slave Lake south to northern South America.

This is by far our commonest falcon, being indeed the only one which is at all abundant. Occasionally it is seen in winter, but more often it

Fig. 75.
Bill of Sparrow Hawk.

arrives from the south early in March, or as soon as the ground is nearly free from snow, and it does not retire southward again till late in the fall, although it is sometimes seen migrating in large scattered flocks in August or September, as described by Professor Frank Smith, in the Bulletin of the Michigan Ornithological Club, Vol. V, 1904, p. 77.

It is found everywhere throughout the state, commonly perched upon some dead stub or bare limb, or more frequently on telegraph wires or on a fencepost in the open field. Often it is seen hovering almost stationary above a clover field, darting down into the grass to seize a grasshopper, cricket, or other large insect, or almost as often a field mouse. Rarely is it seen following birds, and when so engaged the victims are as often English Sparrows as any other species. On the whole it is an extremely beneficial bird and should be rigidly protected. True, it does occasionally kill some small insect-eating bird, but these lapses from virtue are more than atoned for by the continual war which it wages upon injurious insects, field mice, and other vermin. Among 291 stomachs reported upon by Dr. A. K. Fisher, only 1 contained remains of a game bird (quail); 53, other birds; 89, mice; 12, other mammals; 12, reptiles or batrachians; 215, insects; and 29, spiders.

In its nesting habits it is peculiar, since it makes its home almost invariably in the hollow of a tree, usually a more or less natural hollow caused by decay, but not infrequently the hole of a woodpecker, sometimes already deserted, but often deliberately wrested from the owner, usually after a decisive conflict. As a rule the nest is high up in some dead tree, but sometimes quite near the ground. Occasionally a bird-house or dove-cot is used, but these are exceptions. The eggs in Michigan are laid between the middle of May and the first of June. They range in number from two to five (occasionally six or seven), and are generally white or rusty white, thickly speckled and spotted with cinnamon brown, often so thickly as to appear of uniform color. They average 1.38 by 1.11 inches.

As pointed out earlier, this true falcon should not be confounded with the Sharp-shinned Hawk, which is of about the same size and is frequently called the "Sparrow Hawk." The present species is a valuable bird to the farmer, while the Sharp-shinned Hawk is very destructive to wild birds and small chickens.

TECHNICAL DESCRIPTION.

Bill of the falcon type, with tooth and notch; second and third primaries longest and about equal, only the first and second distinctly emarginate on inner web, and in many females and young only the first; tail mainly deep rust-red (chestnut-rufous), with a broad sub-terminal black band.

Adult male: Top of head bluish gray, with or without a central patch of rusty; back, rump and scapulars bright rusty, with more or less numerous black bars; each side of head with two conspicuous black bars, and three more black patches encircling the neck, seven black spots in all; chin and throat white, unspotted; rest of under parts white, either pure or rusty, and with or without streaks and circular spots of deep black; primaries black above, their inner webs with numerous white bars; remainder of upper surface of wing and coverts clear bluish-gray or bluish-slate, more or less spotted with black; tail with the basal three-fourths rich rust-red without bars (except sometimes on outer two pairs), then a broad subterminal bar of deep black and a narrow white tip.

Adult female: Head markings precisely as in male, including the seven black spots, but entire upper parts back of neck, including upper surface of tail, narrowly cross-barred with rusty and black, the subterminal black tail-band much narrower than in male, and the tip rusty or buffy, not white; chin and throat white, as in male, but breast and belly

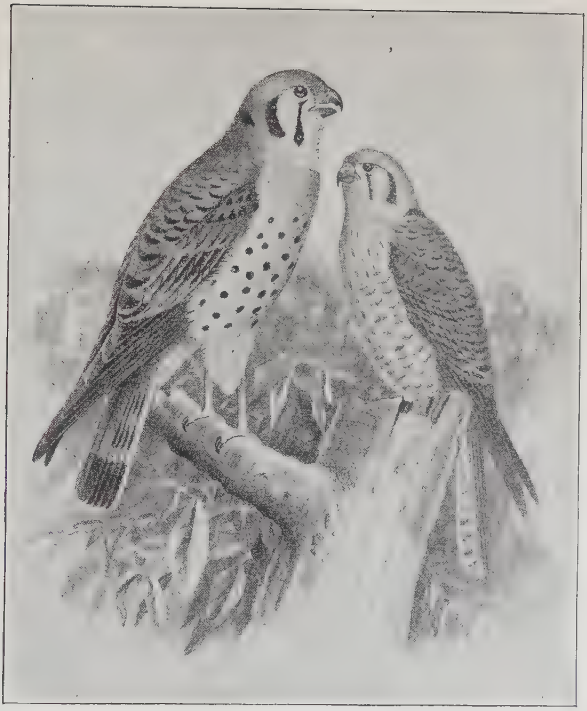

Plate XXIII. Sparrow Hawk. Male (at left) and female.
From North American Fauna No. 16. Courtesy of Biological Survey,
U. S. Department Agriculture.

thickly streaked lengthwise with rusty on a whitish ground; bill black at tip, bluish gray at base; cere and feet yellow; iris brown. Young resemble adults of the same sex.

Male: Length 8.75 to 10.60 inches; wing 6.55 to 8.05; tail 4.20 to 5.45. Female: Length 9.50 to 12; wing 6.90 to 8.15; tail 4.90 to 5.60 inches.

Family 39. PANDIONIDÆ. Ospreys or Fish Hawks.

148. Osprey. Pandion haliaetus carolinensis (*Gmel.*). (364)

Synonyms: American Osprey, Fish Hawk, Fishing Eagle.—Falco carolinensis, Gmel., 1788.—Pandion carolinensis of authors generally.—Pandion americanus, Vieill.—Pandion haliaetus, Rich.—Accipiter piscatorius, Catesby, 1754.

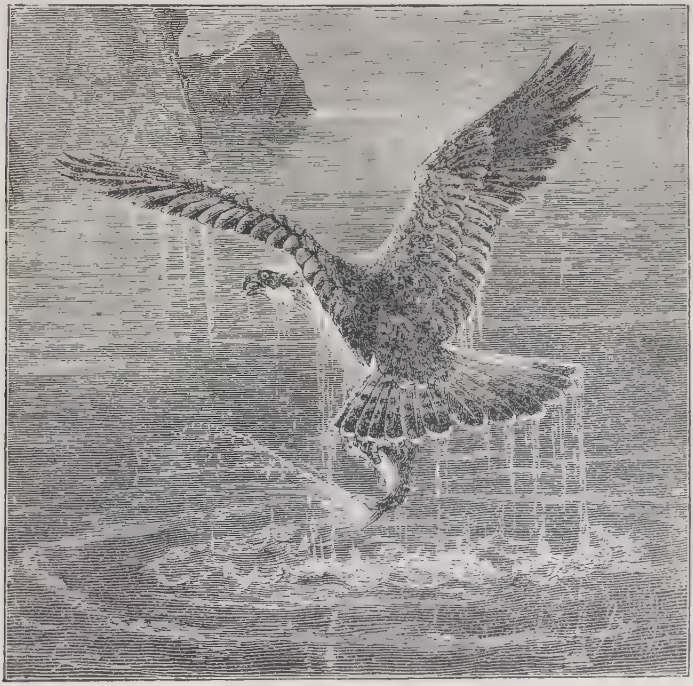

Fig. 76. Osprey; Fish Hawk.
From Coues' Key to North American Birds, 5th ed., 1903.
Dana Estes & Co.

Figure 76.

Intermediate in size between the larger hawks and the eagles, but readily distinguished from both by the character of the feet. Instead of three toes in front and one behind, as in all other hawks and eagles, this bird has the outer toe reversible—turning front or back—as in the owls, and moreover all the claws are of equal size, and long, slender, awl-like and much curved, while the soles of the feet and under sides of the toes are thickly studded with sharp, strong, horny papillæ, evident adaptations for holding slippery fish.

Distribution.—North America, from Hudson's Bay and Alaska south to the West Indies and northern South America, breeds throughout its North American range.

In Michigan the Fish Hawk or Osprey is generally distributed, but apparently nowhere abundant. It arrives from the south soon after the ice breaks up, usually by the middle of March, although in the northern part of the state it appears much later. Unlike most other fish-eating birds, it does not tarry with us until ice forms, but begins to move southward in August or September and is rarely seen in the state after the first of October. It was reported as last seen at Sault Ste. Marie September 14, and at Greenville, September 18. It is by no means confined to the shores of the Great Lakes, but frequents the larger inland lakes during the summer and may appear on any small pond or stream during migration.

Along the middle Atlantic coast this bird sometimes nests in what might almost be called communities, a score or more of nests being found within a radius of a mile or two; but in Michigan the nest is seldom seen and we have never known of two occupied nests in the same immediate vicinity. The nest, at least in Michigan, is almost invariably placed on a tree and at a considerable height, and is occupied year after year by the same birds. In other places, however, the bird frequently nests on cliffs, rocks, low banks, or even nearly level ground, as for example, on Gardner's Island and Shelter Island in Long Island Sound, and at various points along the New England coast.

The eggs are usually three, occasionally only two, and rarely four. They are very variable in shape, size and color; usually heavily spotted with brown and pinkish red on a creamy white ground, but sometimes uniform reddish brown. They average 2.44 by 1.77 inches. But a single brood is reared in a season, but if the eggs are removed from the nest the birds soon lay again. Major Bendire states that he believes the period of incubation to be about 28 days, although usually given as 21.

The Fish Hawk feeds entirely upon fish, for which it poises, or hovers and plunges, almost exactly as does the Kingfisher. It should be noted, however, that while the Kingfisher catches its prey with its bill, the Fish Hawk (like all other birds of prey) uses only its feet. For this purpose the structure of the feet, claws and soles is admirably adapted as already mentioned. In addition it may be said that the claws are rounded below as well as above, not ridged beneath as in most birds of prey. This may be of no particular advantage in clutching the fish originally, but undoubtedly enables the bird to withdraw the claws readily if it becomes necessary. Possibly this fact sometimes saves the bird's life, when through any error in judgment it strikes a fish too large to be landed. In Kumlien and Hollister's Birds of Wisconsin we find the statement that "A specimen was found washed ashore on Lake Koshkonong [Wis.], in June, 1898, with both feet firmly embedded in the back of a very large carp; the fish had proved too large for the hawk and he had weakened in the struggle and drowned."

The fish commonly sought by the Fish Hawk in our waters are of little economic value, and even were the birds much more abundant they could not justly be called harmful. They are powerful and picturesque, which adds much to the interest of the shore in summer, and they should be rigidly protected wherever found. The present law (1912) forbids their destruction and every person should see that the law is enforced.

TECHNICAL DESCRIPTION.

Bill with a very long hook but without the distinct tooth and notch of the falcons; claws all of equal length; second and third primaries longest and nearly equal, the first four emarginate on inner webs.

Adult male: Most of the head and entire under parts pure white, only the sides of the head with a dark stripe, and the crown and occiput more or less streaked with dusky, the upper breast sometimes faintly blotched with brownish; upper parts dark grayish brown, many feathers with narrow whitish edges or tips; tail lighter brown above with about seven or eight dark bars, the inner webs of all but the middle pair distinctly barred below with pure white and dusky.

Adult female: Precisely like male except that the upper breast is more distinctly spotted.

Immature: Similar to adult, but with less white on the head, and usually with most of the feathers of back and upper surface of wings widely margined and tipped with whitish.

Little or no difference in size of male and female (exceptional among hawks). Length 20.75 to 25 inches; wing 17 to 21; tail 7 to 10; expanse of wings about 5½ feet.

Suborder STRIGES. Owls.

This suborder is commonly divided into two families, the Aluconidæ, or Barn Owls, and the Strigidæ, including all the rest. In addition to the diagnostic points mentioned below the Barn Owls have a pectinate middle claw not found in other owls.

KEY TO SPECIES.

A. Lower half of tarsi naked or bristly; facial disk much narrowed below (Fig. 77) Family 40. Aluconidæ. Barn Owl. No. 149.
AA. Tarsi well feathered; facial disk circular or nearly so (Fig. 80). Family 41. Strigidæ. B, BB, BBB.
  B. Large owls, wing 13 inches or more. C, CC.
    C. With prominent ear-tufts or feather-horns (plumicorns). Great Horned Owl and Western Horned Owl. Nos. 157, 158.
    CC. Without prominent ear-tufts. D, DD.
      D. Mainly white, more or less barred with black. Snowy Owl. No. 159.
      DD. Not mainly white. E, EE.
        E. Very large, wing 16 to 18 inches. Great Gray Owl. No. 153.
        EE. Not so large, wing 13 to 15 inches. F, FF.
          F. Under parts thickly streaked but with no cross bars. Short-eared Owl. No. 151.
          FF. Breast heavily cross-barred, only the belly streaked. Barred Owl. No. 152.
  BB. Owls of moderate size, wing from 8 to 13 inches. G, GG.
    G. With prominent ear-tufts. Long-eared Owl. No. 150.
    GG. With very small ear-tufts or none. H, HH.
      H. Under parts heavily streaked, but no cross-bars. Short-eared Owl. No. 151.

HH. Under parts heavily barred, but no streaks. Hawk Owl. No. 160.

BBB. Small owls, wing less than 8 inches. I, II.

I. With prominent ear-tufts. Screech Owl. No. 156.

II. Without ear-tufts. J, JJ.

J. Wing less than 6 inches. Acadian Owl. No. 155.

JJ. Wing more than 6½ inches. Richardson's Owl. No. 154.

Family 40. ALUCONIDÆ. Barn Owls.

Only a single species in Michigan.

149. Barn Owl. Aluco pratincola (*Bonap.*). (365)

Synonyms: American Barn Owl, Monkey-faced Owl, Monkey Owl, White Owl.—Strix pratincola, Bonap., 1838.—Strix flammea, Max., 1820, Wils., Aud., Nutt.—Strix flammea var. americana, Coues, 1872.—Strix flammea, var. pratincola, B. B. & R., 1875.

Figures 77 and 78.

Known at a glance by the light creamy-yellow color, monkey-like "face" (Fig. 78), and absence of ear-tufts. The long, nearly bare shanks and pectinate middle claw are also distinctive.

Distribution.—United States, rarely to the northern border and Ontario, southward through Mexico; northern limit of breeding range about 41 degrees. [In Michigan at least 44°.]

This remarkable owl is a southern bird which finds its northern limit of abundance near our southern boundary but probably nests within the state regularly, if somewhat sparingly. It would seem that within the last two decades the species has become much more common in Ohio and northern Indiana, and it is probable that most of the specimens taken in Michigan have been reared in the state. Formerly it was considered an extremely rare Michigan bird, but we now have between 20 and 30 records for the state, and doubtless many have been killed and not recorded. Most of the records are for the southern half of the state, but there are at least two records for the neighborhood of Saginaw, and according to McIlwraith (Birds of Ontario, p. 223), two individuals were reported as seen near Sault Ste. Marie (Lat. 46° 30′) by C. J. Bampton.

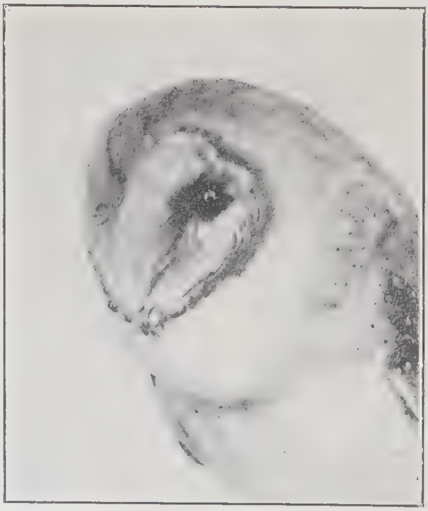

Fig. 77. Barn Owl. Adult.
From mounted specimen. (Original.)

An interesting breeding record is furnished by Mrs. Gene Stratton-Porter, of Geneva, Ind., who found a nest with young in a hollow tree on the "Inland Route," Northern Michigan (probably in Cheboygan county), about the middle of June 1900 or 1901. By the exercise of considerable ingenuity and a vast amount of patience she secured a good photograph of the parent bird as it was about to enter the nest in the early morning. This picture was published in the Ladies Home Journal for June, 1906 (Vol. XXIII, No. 7, p. 25), and appears to furnish the northernmost nesting record for the species, about 45½°.

We have also received an account of a nest of "white owls" found in a hollow tree near Mason, Ingham county, in the spring of 1906, and have no doubt the species was the Barn Owl. Specimens have been taken at or near Monroe, Detroit, Ann Arbor, Ypsilanti, Olivet, Kalamazoo, Hudson, Johnstown, Grand Rapids, Coldwater, Saginaw, Plymouth, Brighton, Howell, Ionia, Grand Ledge, and Lansing. Apparently this species is not migratory, but remains all winter in the vicinity of its nesting places. Several of the specimens above recorded were taken in mid-winter.

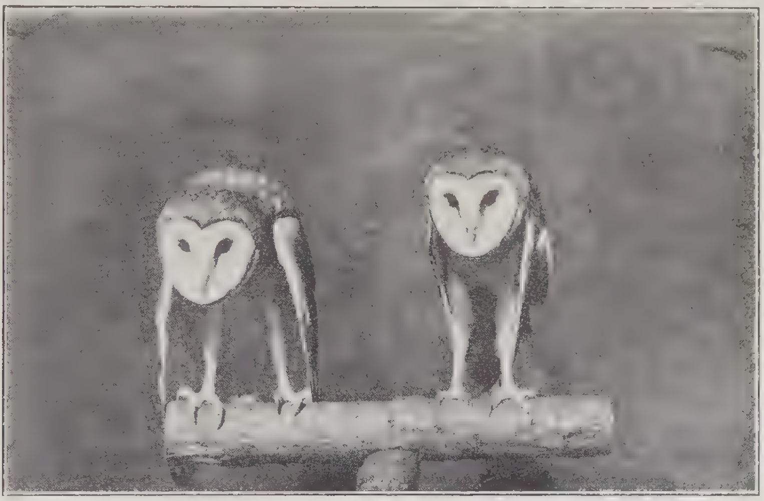

Fig. 78. Barn Owls. About three months old.

Photograph from life by Dr. Thomas H. Jackson.

This species is strictly nocturnal in its habits, and feeds very largely upon rats and mice, although it occasionally takes a small bird, not infrequently an English Sparrow. It also eats ground squirrels, shrews, bats, frogs, insects, crayfish, and more rarely fish. Out of 32 stomachs reported upon by Dr. A. K. Fisher, 1 contained poultry; 3, other birds; 17, mice; 17, other mammals; and 4, insects. An examination of 200 of the "pellets" ejected by a family of these owls showed a total of 454 skulls of small mammals. Of these there were 225 meadow mice; 2 pine mice, 179 house mice, 20 rats, 6 jumping mice, 20 shrews, and 1 star-nosed mole. There was also one skull of a Vesper Sparrow (A. K. Fisher).

Unlike most other owls this species frequently nests in cities and villages and often takes up its abode in the deserted loft of a warehouse, mill or church tower, where, on the bare floor or in a shallow nest made of the disgorged pellets of its own undigested food, the eggs are laid and the young reared. It has been known to nest in hollow trees, and even in crevices of cliffs or holes in sand-banks, but ordinarily it prefers the vicinity of a human habitation, and that doubtless has given it the name Barn Owl.

The eggs, like those of all owls, are white and unspotted, and measure 1.65 by 1.31 inches. The number is very variable, ranging from three to ten, and not infrequently fresh eggs and newly hatched young are found together.

TECHNICAL DESCRIPTION.

Legs long and slender, the shank (tarsus) covered with short feathers above and with bristly, hair-like feathers toward the foot; outer toe reversible, as in all owls; the claw of the middle toe pectinate (with a comb) on its inner edge (unique among our owls); facial disk narrowed and elongated, giving the bird a weird, impish expression, like that of a monkey or an old thin-faced man; none of the primaries emarginate on inner web. General color of plumage above ocher-yellow, silvered with grayish white and sprinkled with conspicuous dashes or spots, about half of each spot being black and the other pure white; under parts pure white, creamy white, or deep buff, thinly speckled with dusky; bill yellowish-white; iris dark brown; primaries with four to six dusky bars on inner webs; tail with four or five narrow blackish bars, most obvious on upper surface.

Sexes of nearly the same size (unusual in birds of prey). Length 15 to 21 inches; wing 12.50 to 14; tail 5.70 to 7.50.

Family 41. STRIGIDÆ. Horned Owls, Screech Owls, and others.

This family includes all our Michigan owls except the Barn Owl, ten species in all. For key to species see page 297.

150. Long-eared Owl. Asio wilsonianus (*Less.*). (366)

Synonyms: American Long-eared Owl, Lesser Horned Owl.—Otus wilsonianus, Less., 1830.—Otus americanus, Bonap.—Strix otus, Wils., Aud.—Otus vulgaris, Jard.—Otus vulgaris var. wilsonianus, Ridgw., 1872, B. B. & R., 1875.

Figure 79.

We have in Michigan only three species of owls which have conspicuous ear-tufts, namely, the Great-horned Owl, the Long-eared Owl and the Screech Owl, or Mottled Owl. The first is a very large bird whose wings expand from four to five feet; the last a small one whose wings expand little more than a foot. The Long-eared Owl is but slightly heavier than the Screech Owl, but its measurements exceed it noticeably. It may also be separated from that species by its proportionally much longer tail.

Distribution. —Temperate North America; south to the table lands of Mexico. Breeds throughout its range.

This does not seem to be an abundant owl in Michigan. In the southern half of the state it is by no means uncommon, but we have practically no records from the northern half of the Lower Peninsula, and but one (Munising, June, 1906) from the Upper Peninsula. This may be due to the fact that the ordinary observer confounds the Long-eared Owl with the Screech Owl, but if this bird occurs in any numbers in the north it should have been reported by some of the good observers who have collected at various points there. Mr. Newell A. Eddy of Bay City states that he has but a single record for that region. It is not recorded by Dunham for Kalkaska county, nor was it found by Otto Widmann, or by the writer, in Emmet county. Major Boies did not find it on Neebish Island or along the St. Mary's River, not has it been reported by Osborn, Melville or Steere from Sault Ste. Marie. It does not occur in Kneeland's list of the Birds of Keweenaw Point, nor did O. B. Warren find it during several years of observation at Palmer, Marquette county. Other observers in Marquette county have failed to report it, and the writer did not see or hear of it during a week's collecting in Marquette, Alger and Chippewa counties. Finally, it was not found by any of the Biological Survey expeditions to Ontonagon county, Dickinson county, or Isle Royale.

Of course this does not prove that it does not occur in any or all of these counties, and we know that the bird is naturally secretive and its protective coloration enables it to escape observation very easily. Nevertheless it is singular that we do not have other records from this large section of the state. In looking over the notes relating to the Lower Peninsula one is struck with the paucity of recent records, and it seems not unlikely that this is one of the species which has been decreasing in numbers of late.

The Long-eared Owl is believed to nest wherever found, and the great majority of eggs found have been laid in old crow's nests which have been more or less repaired for the purpose. Ordinarily the nest is placed at a height of ten to forty feet from the ground and the eggs would seem to be laid quite early in the season, often early in April, although Mr. E. B. Schrage of Pontiac, took a set of five eggs May 11, 1898. A set of four taken by Jerome Trombley, in Monroe county, May 14, 1889 were almost ready to hatch, and Dr. Gibbs reports a nest of young ready to fly May 22, 1878 at Kalamazoo. He also mentions six eggs of this species collected near Kalamazoo April 27, 1878 by A. Chambers. A nest found by Norman A. Wood, May 20, 1907, in a tamarack tree at Portage Lake, Washtenaw county, contained two young in the down. Leon J. Cole found a young one, more than half grown, at Chandler's Marsh, Ingham county, May 31, 1897.

Mr. Amos Butler says that in Indiana the birds begin laying in March or April and that incubation begins with the first egg laid and lasts about three weeks (Birds of Indiana, p. 804). Major Bendire states that the Long-eared Owl rarely constructs a nest of its own; fully three-fourths of the nests he has found were old nests of the Crow. This species is generally supposed to rear but one brood, yet there are some facts to show that it sometimes rears two broods in a season, and like most other birds of prey when robbed of its eggs it will lay a second set in the same nest or at least in the same vicinity. The eggs are from three to six in number, pure white, unspotted, and average 1.66 by 1.28 inches.

The food consists very largely of mice and other rodents, and although a few birds are eaten they are mostly seed-eaters and the harm so done is not serious. Of 92 stomachs reported upon by Dr. A. K. Fisher, 1 contained a game bird (quail); 15, other birds; 84, mice; 5, other mammals; and 1, insects. About 50 "pellets" of this species, collected at Munson Hill, Virginia by Dr. Fisher, yielded 176 skulls, of which all but 13 were mammals. Among these were 95 meadow mice, 19 pine mice, 15 house mice, 5 white-footed mice, 3 Cooper's mice and 26 shrews. Of the other skulls, 11 were sparrows, 1 a Bluebird, and the other a warbler.

It is hardly necessary to add that this owl is decidedly beneficial to the agriculturist and should be rigidly protected.

Major Bendire says that "except during the mating season it is rather a silent bird and the few notes heard are low-toned and rather pleasing than otherwise. One is a soft-toned 'wee-hunk, wee-hunk,' slowly and several times repeated—another is a low twittering, whistling note like 'dicky, dicky, dicky' " (Life Histories, I, 328).

TECHNICAL DESCRIPTION.

Ear-tufts (feather-horns or plumicorns) very conspicuous, black or black and tawny, edged with whitish on inner margin; first primary emarginate on inner web near tip; facial disk rusty or buffy, lightest between eyes and bill, edged with black; upper parts mottled with brownish-black, buff and white; under parts buffy white, thickly and broadly streaked with dusky on the breast, spotted and barred (in "herring-bone" pattern) on belly and sides with dusky and clear black; primaries heavily marked with blackish and buffy cross bars, the dark bars broadest; tail with six to ten narrow dusky cross bars, the spaces between being light grayish-brown on the upper surface, nearly white below; tarsi and toes pale buff, unmarked; bill blackish with lighter tip; iris dark yellow.

Length 13 to 16 inches; wing 11.50 to 12; tail 6 to 6.20. (The larger measurements are those of the female.)

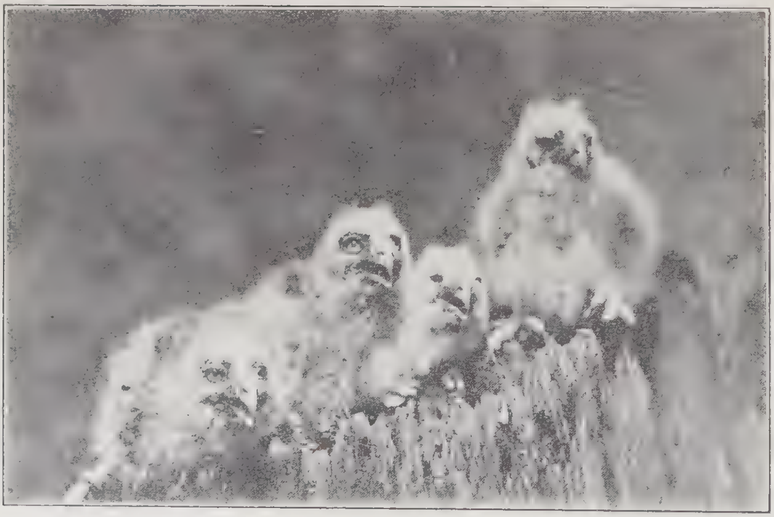

Fig. 79. Long-eared Owls. About three weeks old.
Photograph from life by Dr. Thomas H. Jackson.

151. Short-eared Owl. Asio flammeus (*Pont.*). (367)

Synonyms: Marsh Owl, Swamp Owl, Prairie Owl.—Strix flammea, Pont., 1763.—Strix accipitrina, Pall., 1771.—Strix brachyotus, Gmel., Wils., Aud.—Brachyotus palustris, Bonap., 1838.—Brachyotus palustris americanus, Bonap., 1849.—Otus (Brachyotus) brachyotus, B. B. & R., 1875.—Asio accipitrinus, A. O. U. Check-list, 1895.

Plate XXIV.

A medium sized owl, just about the size of the Crow, heavily streaked above and below with buffy white and dark brown, and with ear-tufts very inconspicuous, but to be found if carefully looked for.

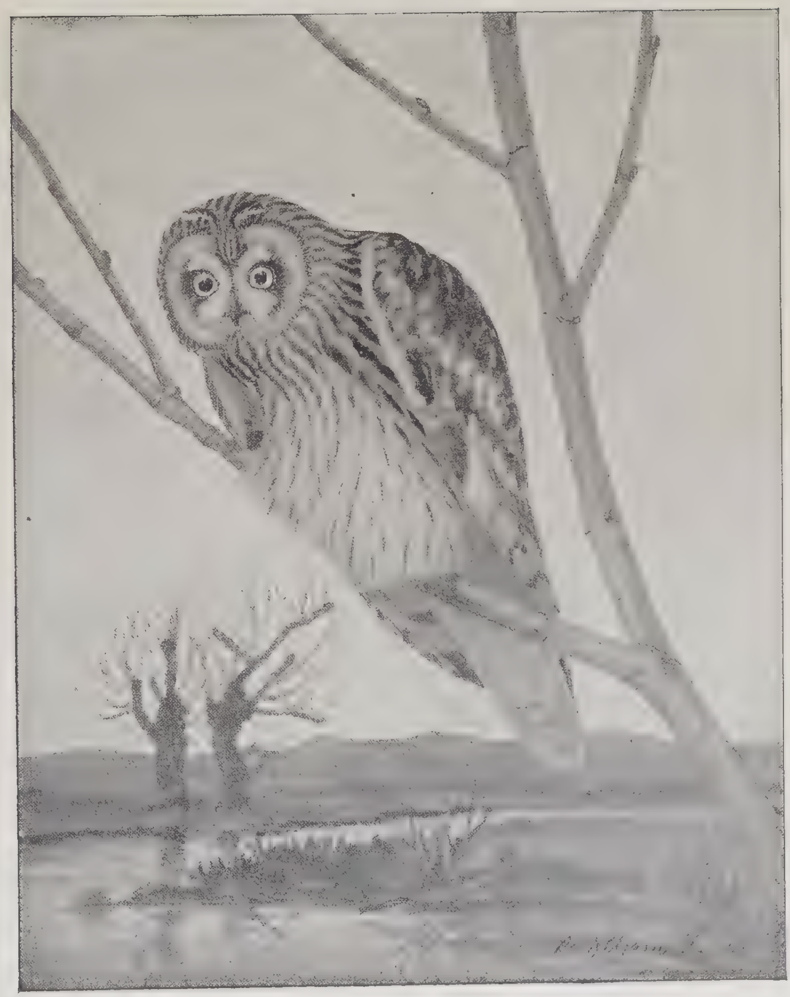

Plate XXIV. Short-eared Owl.

Courtesy of National Committee of Audubon Societies.

Distribution.—Throughout North America and much of South America; nearly cosmopolitan. Breeds, somewhat irregularly and locally, from about latitude 39° northward.

This owl differs widely in its habits from all other Michigan owls, since it is found only in open ground, and roosts and nests invariably on the ground. Although we have seen hundreds of these birds, we have never yet seen one perched on a bush or tree and but rarely on a fence or post.

We do not recall any note uttered by this owl, and believe that ordinarily it is entirely silent. Major Bendire says that while hunting at evening a faint squeak, like that of a mouse, was the only note heard, but while examining a nest one of the birds "uttered a weak whistling sort of note two or three times."

They are most often seen in October or November when flushed from the long grass where they are resting during the day, after gorging themselves on field mice. They have a habit of gathering in some numbers in places where the fields are overrun with these mice, and sometimes a score or more may be found within the compass of a few acres. When started by day they fly somewhat irregularly, often circling about the intruder, and generally alight again after a flight of 200 or 300 yards. After sunset they may be seen flying back and forth over grass lands very much in the manner of a Marsh Hawk.

In Michigan this is an abundant owl in autumn, probably the most so of any, unless it be the common Screech Owl. It is distributed somewhat unevenly, so that in some regions it is abundant and in other places it may be almost unknown, yet anyone who hunts quail is almost sure to run across it at least once or twice each fall. It also winters occasionally within our limits. It is a species of wide distribution, ranging from arctic regions southward in winter at least to Panama, and very likely much farther, since it has been recorded from Brazil, Chile and Argentine Republic. The writer found it rather common on the Lower Uruguay river, Arg. Rep., in May and June, 1880 (winter months), which would seem to show that it nested still farther south (Auk, 1, 1884, 29). Being a bird of remarkable powers of flight and endurance it has been found frequently on islands far from land (in one instance on the Hawaiian Islands), and occasionally it has been known to rest on vessels when hundreds of miles from shore.

Doubtless the greater number seen in Michigan are migrants, and nest considerably to the northward of us, yet a few undoubtedly rear their young each year within our limits. The nest is placed on the ground, usually among bushes or clumps of coarse weeds, and the five or six pure white, unspotted eggs are laid commonly in May, but sometimes not until June. They average 1.59 by 1.23 inches.

We have few records of its nesting in the state, but this is not surprising when we consider its scarcity in summer and that few observers visit the places where it is likely to be found at that season. Covert records a nest found near Ann Arbor, May 3, 1877, and Butler records a nest in Indiana, with three young and two eggs, May 6, 1890, and another on the same date with three eggs. Mr. John Uphaus tells me that he found several young of this species, just able to fly, sitting around on stumps in an open part of Freedom Swamp, Washtenaw county, May 30, 1903. Mr. J. Claire Wood writes that in the summer of 1906 he took two young of this species in the down, in Wayne county, and Mr. Norman A. Wood informs me that a hunter once told him of a pair nesting in a marsh in the Portage Lake region, Washtenaw county. "On June 25, 1907, three young, still in the down, were brought to the University Museum to be mounted. They were taken in a marsh seven miles southwest of Ann Arbor and must have been bred where they were found" (N. A. Wood). There is also in our Agricultural College collection the skin of an adult female taken on Chandler's Marsh, Ingham county, June 21, 1897, by Thomas L. Hankinson.

Of 87 stomachs reported upon by Dr. A. K. Fisher, 11 contained small birds; 77, mice; 7, other mammals and 7, insects. While this would indicate that the food consisted mainly of mice, which we believe to be the case, it seems likely that when feeding young in the nest this owl may prey more extensively upon birds. In "Birds of Wisconsin," p. 69, we find an account of a nest of three young found at Delevan, Wis., May 29, 1898, which were "literally resting on a mass of wing and tail-feathers of the victims of their appetites. From this mass we picked out over 600 feathers, and among them positively identified more than 30 species of birds. No trace of a mammal was found either about the nest or in the pellets around it."

TECHNICAL DESCRIPTION.

Ear-tufts or plumicorns rudimentary, scarcely visible; first primary emarginate on inner web near tip. Adult: Facial disk coal black about the eyes, grayish or buffy about the edge, whitish above the inner corners of the eyes; chin white; upper parts buffy white to deep buff or even rufous, thickly and broadly streaked with brownish black; under parts similar, but the dark stripes broad and close only on the throat and chest, becoming narrower and scantier on breast and belly, and sometimes entirely wanting on the under tail-coverts; tarsi and toes closely feathered, pale buff, unmarked; first three primaries with two dark bars on inner webs near the tips, and usually with a third spot or imperfect bar about the middle; rest of inner web buffy or whitish; tail whitish, buffy or rusty, with four or five narrow dusky bars; bill blackish; iris dark yellow.

The female is larger than the male, but not otherwise different; the young of the year are darker than old birds, especially above, while the under parts are less thickly streaked, sometimes not at all. Length 13.80 to 16.75 inches; wing 11.80 to 13; tail 5.80 to 6.10.

152. Barred Owl. Strix varia varia *Barton.* (368)

Synonyms: Hoot Owl, Rain Owl, Wood Owl.—Strix varius, Bart., 1799.—Strix nebulosa, Forst., and the older authors generally.—Syrnium nebulosum, Gray, 1844, and most recent writers.

Plate XXV.

Known from the Great Horned Owl by its somewhat smaller size and absence of ear-tufts; also by the greenish-yellow beak and dark brown eyes. The only other owl with which it could be confounded it the Great Gray Owl, which is decidedly larger (although of about the same weight) and has a yellow eye instead of a brown one.

Distribution.—Eastern United States, west to Minnesota, Nebraska, Kansas and Texas, north to Nova Scotia and Quebec. Breeds throughout its range.

This is undoubtedly the commonest large owl in Michigan and the one most often killed by "sportsmen." It is a bird of the forest and is seldom seen outside of the woods, although often obliged to be contented with the fringe of large trees along a stream. Its range does not extend much farther north than Upper Michigan, and probably it is more abundant in the southern half of the state; but it has a decided preference for heavily wooded regions and has decreased rapidly wherever the country has been cleared up.

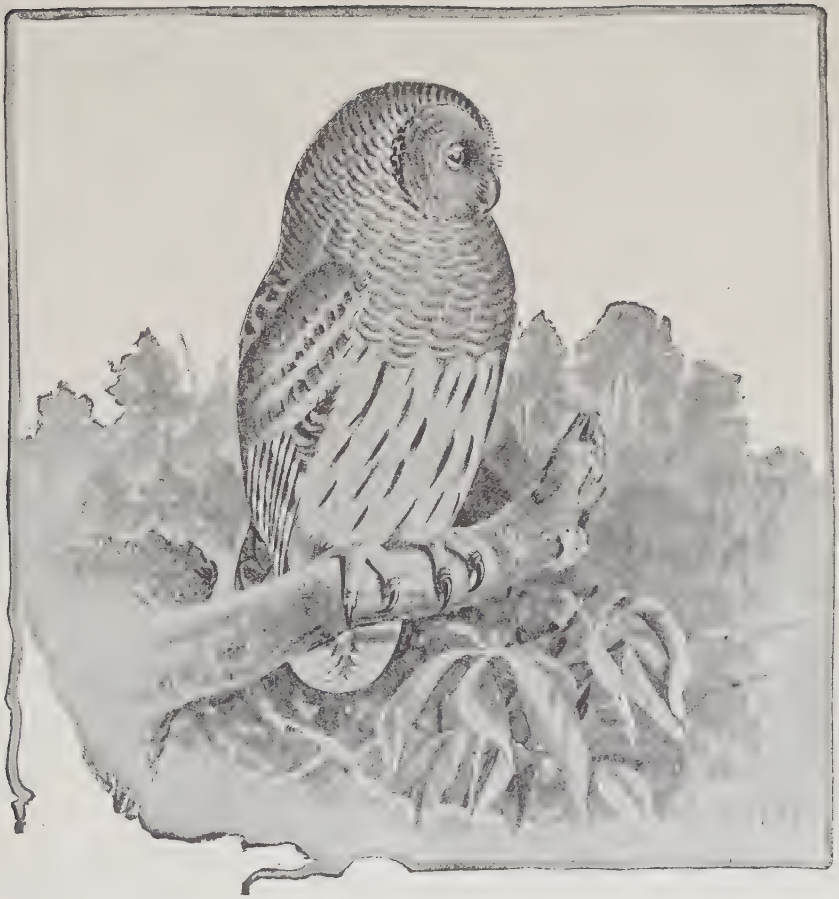

Plate XXV. Barred Owl.

From Yearbook of Department of Agriculture, 1894.
Courtesy of Biological Survey.

Mr. Purdy writes from Plymouth, Washtenaw county: "Quite abundant here a few years ago, but now quite rare and will soon become extinct unless there is some law to protect them. During my experience, of the past 61 years, I have never known them to kill poultry, but a fool with a gun will not allow one to exist if he can prevent it." It is recorded by White at Mackinac Island, and by Major Boies at Neebish Island, St. Mary's River. In Marquette county O. B. Warren calls it uncommon, but it is resident there and breeds. Both Judge Steere and W. P. Melville state that at Sault Ste. Marie it is the most abundant species of owl. At Petersburg, Monroe county, Jerome Trombley says it is now nearly extinct.

This owl sees well in the day time and occasionally hunts by day in cloudy weather. According to Bendire mating begins in February, early or late according to the latitude, and in the middle states the eggs are laid from the second week in March to the first week in April. Mr. Covert states that at Ann Arbor it nests from the last week in March to the middle of April, and Dr. Gibbs says that C. W. Gunn found Barred Owls nesting in the hollow limb of a sycamore tree in Kent county, April 12, 1879.

In Kalamazoo county the late Richard Westnedge found a nest April 28, 1891, containing three young birds, and another, evidently an old hawk's nest, in a basswood, 60 feet up, had a single egg well advanced in incubation, April 9, 1893. K. R. Wilhelm found one egg and a two-day-old chick in a cavity of a dead birch in the same county, April 21, 1887, the nest made of dead leaves and feathers and nearly level with the opening. A second nest found in the same vicinity, April 15, 1891, by the same collector, had three eggs containing advanced embryos. It usually nests in hollow trees, very rarely in an old nest of hawk or Crow. The eggs are usually three, sometimes but two, very rarely four. But one brood is reared in a season, and the period of incubation is variously given as three to four weeks. The eggs are white, unspotted, and average 1.94 by 1.65 inches.

Probably this is the noisest of our owls. It has a variety of harsh screams, some of which are almost blood-curdling. Bendire speaks of "the unearthly, wierd call-notes peculiar to this species, which surpass in startling effect those of all other owls with which I am familiar." He states further that the common notes are "hoo-hoo, hoo-hoo-too-too." It often calls in the day time in dark weather, and is most noisy when mating, several birds often uniting to form an indescribable chorus.

Dr. A. K. Fisher sums up the food habits of this owl in the following words: "While the general statements of certain authors, especially the earlier ones, charge the bird with the destruction of poultry, game and small birds, such destructive habits are comparatively uncommon. That it does occasionally make inroads upon the poultry yard, and does more or less damage among game birds, is true; but such acts are exceptional, and the examination of a large number of stomachs shows that the greater part of its food consists of mammals. And it is to be noted that among the list are some of the most destructive rodents the farmer has to contend with. If a fair balance is struck therefore, it must be considered that this owl is on the whole beneficial and hence should occupy a place on the list of birds to be protected" (Hawks and Owls of the U. S., 1892, 151-152). Of 89 stomachs reported upon by Dr. Fisher, 5 contained poultry or game; 13, other birds; 46, mice; 18, mammals; 4, frogs; 1, a lizard; 2, fish; 14, insects; 2, spiders; and 9, crayfish.

TECHNICAL DESCRIPTION.

No ear-tufts or plumicorns; five outer primaries emarginate or sinuate on inner webs; facial disk gray, with several concentric, narrow, dark rings or lines; iris dark brown; bill yellow or yellowish-white.

Adult: Upper parts deep brown (umber) regularly barred with pure white, these white bars shortening to squarish or rounded spots on some of the wing-coverts and outer webs of secondaries; throat and breast similarly barred but much grayer anteriorly, white or grayish-white predominating on the throat and chest; belly and sides without any cross-bars, but heavily striped lengthwise with dark brown on nearly pure white; primaries barred on inner webs with blackish and buffy white, the dark bars broadest; tail of same color as back, with whitish tip and about five narrow white or brownish bars. Sexes alike except that the female is largest. Young similar as to wing and tail feathers, but entire under parts uniformly barred with light brown and buffy white, the bars of about equal width.

Length: 19.75 to 24 inches; wing 13 to 14; tail 9.

153. Great Gray Owl. Scotiaptex nebulosa nebulosa (*Forst.*). **(370)**

Synonyms: Spectral Owl.—Strix nebulosa, Forst., 1772.— Strix cinerea, Gmel., 1788.—Syrnium cinereum, Aud., 1839.—Scotiaptex cinerea, Swains., 1837.

Plate XXVI and Figure 80.

By measurement the largest of our owls, the wing reaching 16 to 18 inches. The absence of the ear-tufts separates it from everything but the Barred Owl, and its yellow eyes and dusky gray plumage distinguish it from that species.

Distribution.—Arctic America, straggling southward in winter to southern New England, New York, New Jersey, Ohio, Illinois, Idaho and northern Montana.

The Great Gray Owl must be considered one of our rarest birds. It is never seen except in winter, and often several years may pass without one being recorded. Occasionally, as with most other northern birds, it becomes more numerous, or rather less uncommon, and several specimens may be taken in a single winter. Undoubtedly the greater number are shot by deer hunters and woodsmen who do not appreciate the rarity of the bird, probably confounding it with the Barred Owl.

We have records from Falmouth, Missaukee county, December 1881 (Covert); Munising, Alger county, November 1891 (Covert); Trout Lake, Chippewa county, November 11, 1897 (Selous); and we have a specimen in the Agricultural College collection, taken at St. Ignace, Mackinac county, in January, 1894. There is also a fine specimen in the Kent Scientific Museum, taken November 15, 1906, near Germfask, Schoolcraft county. Mr. E. R. Kalmbach, who mounted this bird informs me that the stomach contained six short-tailed meadow mice. Mr. W. B. Mershon, of Saginaw, has a very nice specimen in his collection, killed several years ago in the Upper Peninsula, but the exact date and place of capture are unknown. Major Boies states that it is occasionally seen on Neebish Island (presumably in winter), and Judge Steere, of Sault Ste. Marie, tells me that he has seen several specimens, more or less mutilated, hung up at deer camps in the woods in Chippewa and neighboring counties.

There is not the slightest reason to suppose that it ever nests within our limits, nor has it ever been recorded except in winter. During the winter of 1889-90 it was more common in New England than ever before, and numbers were captured. According to Major Bendire it nests from the

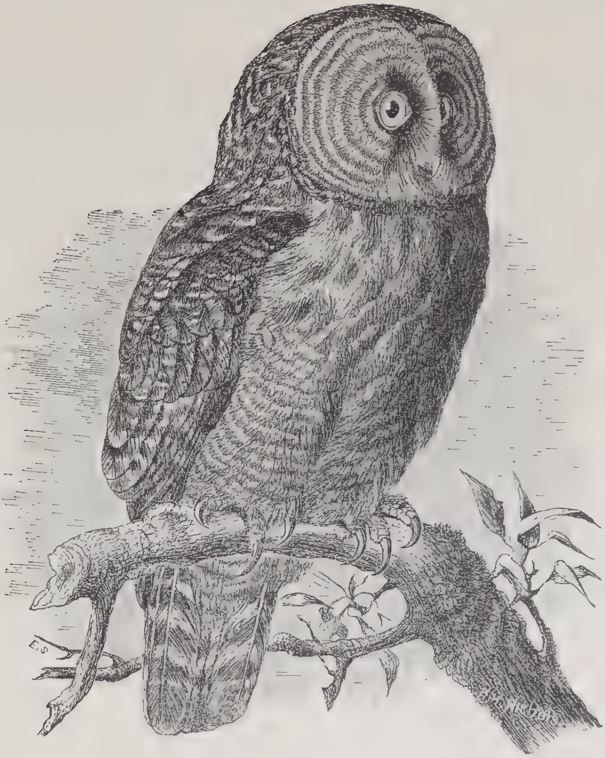

Plate XXVI. Great Gray Owl.

From Baird, Brewer and Ridgway's North American Birds.
Little, Brown & Co.

shores of Hudson's Bay northward to the limit of trees, about 68 degrees. In Alaska it nests near the sea as early as April, and in the interior as late as the middle of June. The nest is placed in trees, and the eggs, two to four, are dull white with little luster, unspotted, and average 2.16 by 1.71 inches.

Although this bird exceeds the Great Horned Owl in measurements, its weight is much less, in fact seldom greater than that of the Barred Owl. Its plumage is very soft, fluffy and deep, so that it appears to be a much heavier bird than it really is.

Little seems to be known of its food, but it probably feeds largely on hares, meadow mice and squirrels, together with ptarmigan and smaller birds. It is commonly reported to feed mainly at night, but since its habitat lies in large part within the Arctic Circle, it must do all its hunting during the summer by daylight.

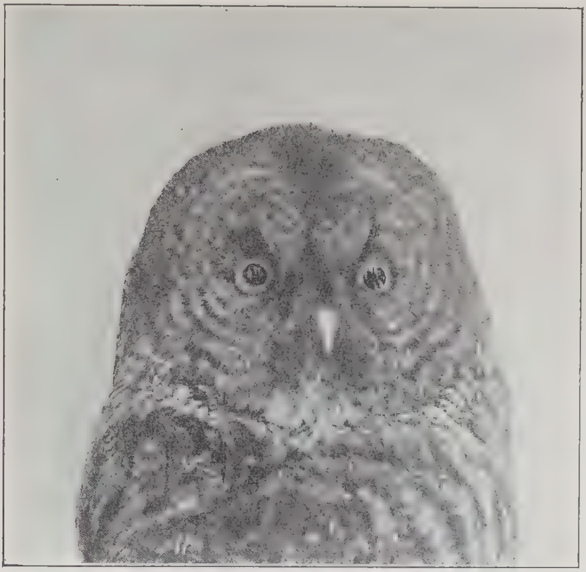

Fig. 80. Great Gray Owl. Adult.

From photograph of museum specimen. (Original.)

TECHNICAL DESCRIPTION.

Ear-tufts or plumicorns entirely absent; feet and toes heavily feathered to the base of the claws; first six primaries emarginate or sinuate on inner webs near tip; iris yellow.

Adult: Dark grayish brown above, irregularly mottled with grayish-white, and with some indistinct cross-bars; under parts mottled grayish white and dusky, with irregular dark grayish-brown stripes on breast and belly, and bars of same color on flanks, facial disk grayish, with numerous concentric dark rings; bill yellowish or nearly white; claws dark. Sexes alike in color, but female largest.

Length 25 to 30 inches; wing 16 to 18; tail 11 to 12.50; spread of wings 4½ to 5 feet.

154. Richardson's Owl. Cryptoglaux funerea richardsoni (*Bonap.*). (371)

Synonyms: Arctic Saw-whet Owl, Sparrow Owl.—Nyctale richardsoni, Bonap., 1838. —Strix tengmalmi, Rich. & Swains., 1831.—Nyctale tengmalmi var. richardsoni, Ridgw., 1872, and most subsequent writers.

Plate XXVII.

About the same weight as the Screech Owl, but with slightly longer wings and decidedly longer tail. Besides lacking the ear-tufts, it is easily recognized by its chocolate-brown color above, spotted with white, and the white under parts striped lengthwise with brown.

Distribution.—Arctic America, south in winter into the northern United States. Breeds from the Gulf of St. Lawrence and Manitoba northward.

This is another decidedly rare owl in Michigan, and like the preceding is found only in winter, and then only at long intervals. Owing to its small size it probably escapes observation and capture more often than does the Great Gray Owl, so that the lack of records must not be taken to indicate extreme rarity. We have a specimen in the Agricultural College collection, doubtless from northern Michigan, but without other data. Mr. W. P. Melville, of Sault Ste. Marie, Mich., writes that there are two male specimens of Richardson's Owl in the high school museum at that place, taken in the immediate vicinity, by Mr. Mark Cady, one on February 22, 1900, and the other January 28, 1902. Mr. A. B. Covert records two females taken at Ann Arbor in December, 1877, one on the second and the other on the thirteenth of the month. He also states that a male was killed in a barn at Cadillac, Michigan, November 28, 1881, and that "Mr. Warren of Duluth, gets all he wants there."

According to Bendire it is "Possibly a very rare resident from latitude 46 degrees northward, becoming more abundant as higher latitudes are reached. It appears to be very common about Great Slave Lake, seems not to see well at all in daylight, and may often be caught in the hand. It probably nests always in holes in trees; possibly, as a rare exception, in deserted open nests of other birds." The eggs are two to seven, white and unspotted, and average 1.35 by 1.14 inches.

Napoleon A. Comeau states that near Godbout, Quebec, it "has a liquid note like dripping water."

Little is known of its food, but it appears to subsist mainly on mice and small birds. In Michigan it is so rare that of course it has no economic importance.

TECHNICAL DESCRIPTION.

Small; no ear-tufts or plumicorns; iris yellow; bill white; first three primaries emarginate or sinuate on inner webs near tip; feet heavily feathered to the very claws.

Adult: Upper parts chocolate-brown, with more or less numerous white spots; under parts white, with numerous broad streaks of brown which extend even to the under tail-coverts; wing and tail feathers with numerous paired white spots, those on the tail tending to form two or three white cross-bars; tarsi and feet buffy, spotted with brown. Sexes alike, but female largest.

Length 9 to 12 inches; wing 6.60 to 7.40; tail 4.10 to 4.70.

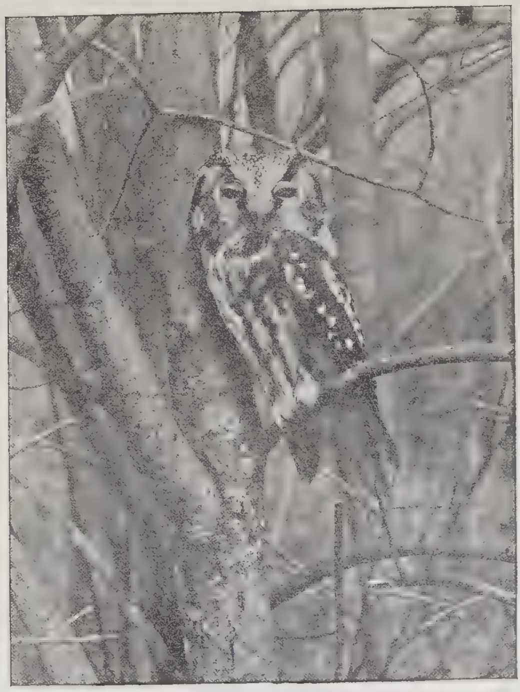

Plate XXVII. Richardson's Owl.

Photograph from life. From Bird Lore. Courtesy of P. B. Peabody.

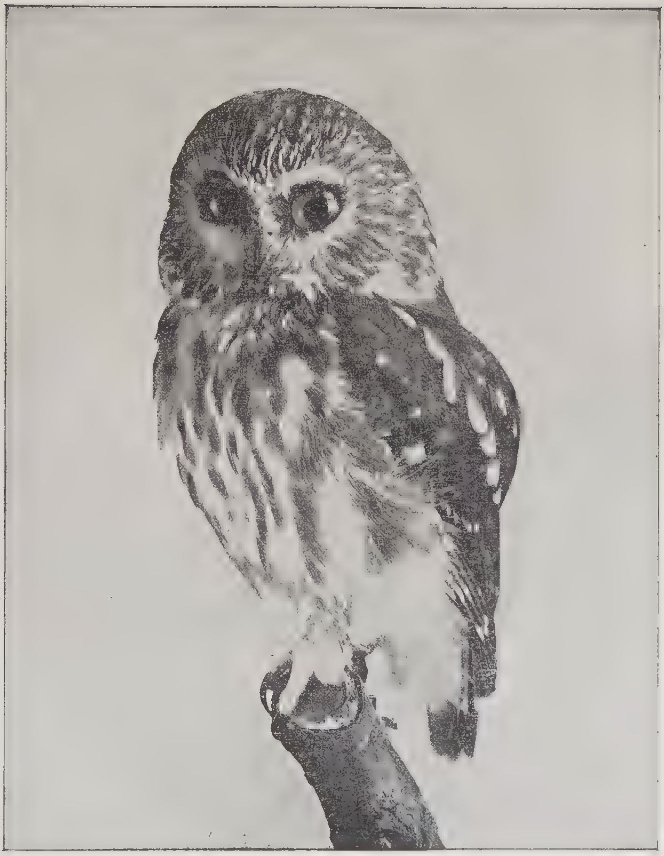

Plate XXVIII. Acadian Owl.
From Bird Lore. Courtesy of Frank M. Chapman.

155. Acadian Owl. Cryptoglaux acadica acadica (*Gmel.*). (372)

Synonyms: Saw-whet Owl, Sparrow Owl, White-fronted Owl (young), Kirtland's Owl.—Strix acadica, Gmel., 1788, Aud., and others.—Nyctale acadica, Bonap., 1838, and authors generally.—Strix passerina, Penn.—Strix frontalis, Licht.—Nyctale albifrons, Cass.

Plate XXVIII.

Smallest of our owls, the wing less than six inches. This, together with the absence of ear-tufts, and the numerous small white spots above and brownish stripes below, readily identifies the bird.

Distribution.—North America at large, breeding from the middle states northward, and in mountainous regions of the west southward into Mexico.

A dainty little owl, doubtless much more common than generally supposed, and well distributed over the entire state. Its small size, strictly nocturnal habits, and protective coloration make it easy for it to avoid detection. During the day time it secretes itself amid the thick foliage of trees, evergreens being preferred. At such times it is ridiculously tame and may sometimes be captured alive in the hands. It is commonly stated to be resident wherever found, and it is certain that in Michigan our records are more numerous in winter than in summer. Nevertheless a considerable movement of the birds southward in cold weather has been noted and there is a decided increase in their numbers in the middle and southern states during the winter season. Mr. W. E. Saunders found 24 dead Acadian Owls among the hundreds of migrants which perished in a snow storm on the east shore of Lake Huron, the night of October 10-11, 1906. For a full account of this disaster see the Auk, Vol. XXIV, 1907, pages 108-110. Part of the account is quoted in the introduction to the present volume, pages 26-27.

The nest is placed always in a hollow tree, and the eggs, in Michigan, are probably laid early in April, at least before the first of May, and there is no reason to suppose that more than a single brood is reared in a season. The eggs vary in number from three to seven, are white and unspotted, and average 1.19 by 1 inch.

The note of this bird is said to resemble that made by filing a saw, yet in our own experience we have been unable to detect the resemblance. Dr. W. L. Ralph says "their call is a frequently repeated whistle, sometimes uttered in a high and again in a low key, in either a slow or rapid cadence. Generally it is commenced slowly and gradually becomes faster and faster until it ends quite rapidly. This call, which is the only one I have ever heard them give, sounds not unlike the noise made during the operation of filing a saw, and it is easily imitated."

The food consists largely of mice, but it doubtless also eats squirrels, chipmunks, and an occasional bird. Of 19 stomachs reported upon by Dr. A. K. Fisher, 17 contained mice; 1, a bird (sparrow); and 1, an insect.

TECHNICAL DESCRIPTION.

Smallest of Michigan owls; very much like Richardson's Owl, but much smaller; no ear-tufts or plumicorns; iris yellow; bill blackish; two or three outer primaries emarginate or sinuate on inner webs.

Adult: Upper parts olive-brown or reddish-brown, lined with white on forehead and crown, spotted with white on back of neck, scapulars, and sometimes elsewhere; under parts white, streaked with reddish brown; tarsi and toes buffy white, without markings;

facial disk whitish or gray; wing and tail feathers with pairs of rounded white spots, those on the tail forming two or three imperfect bars, besides the white tip.

Young: Similar to adult only in size and wing and tail markings; upper parts reddish-brown without any light spots; under parts brown in front, yellowish posteriorly, and without any streaks; facial disk dark brown with a white stripe above each eye, this white "eyebrow" giving the name "White-fronted Owl."

Length 7.25 to 8.50 inches; wing 5.25 to 5.90; tail 2.80 to 3.25.

156. Screech Owl. Otus asio asio (*Linn.*). (373)

Synonyms: Mottled Owl, Red Owl, Gray Owl, Little Horned Owl.—Strix asio, Linn., 1758, Gmel., Shaw. Wils., Aud.—Scops asio, Bonap. and many others.—Megascops asio, Stejn., 1885, and most subsequent authors.

Plate XXIX and Figure 81.

Our only small owl with conspicuous ear-tufts; but recognizable also by the absence of white dots above, the feathers of back and breast whatever their color always showing dark shaft stripes.

Distribution.—Temperate eastern North America, south to Georgia and west to the plains. Accidental in England.

Throughout most of Michigan this undoubtedly is the commonest owl, found not only in thickly wooded regions, but in almost equal abundance in the older settled parts of the state, where it frequents orchards, groves, and the fringe of timber along the streams, and is even found in the small parks or the shade trees along the streets in our largest cities. In spite of the fact that this owl is almost invariably killed by man whenever opportunity offers, it has held its own during recent years and probably is as abundant now in most localities as it was fifty years ago. It is perhaps somewhat less plentiful in the Upper Peninsula, but it doubtless occurs in every county in the state and appears to be resident wherever found.

During the day it secretes itself in some hollow tree, or more rarely in some sheltered retreat among the thickest foliage (preferably of an evergreen), and ventures forth only after sunset unless earlier discovered, mobbed, and driven from place to place by Blue Jays and other birds, which are always on the lookout for their enemies.

The ordinary call of the Mottled Owl is a series of clear, tremulous and plaintive, but rather musical notes, suggesting a wail rather than a screech and by no means justifying the common name "Screech Owl." This call is uttered at all hours of the night and at all seasons of the year, although according to our experience most frequently and persistently during the earlier part of the breeding season. Nevertheless Mr. Eugene Bicknell states that in the lower Hudson Valley "The late summer far more than the spring seems to be the season when its cry is most frequent and most regular from year to year. Usually, after a considerable time of silence, it begins to quaver in July or in August, thence continuing off and on until winter. I am not without scattering records of having heard it in winter; but it is virtually a silent bird from December or earlier until March or later. With some uniformity it is to be heard for a short time in late March or early April; but I have not a record for late April, May or June" (Auk, II, 260-261).

The nest is placed invariably in the hollow of a tree, perhaps most often a natural hollow, but not infrequently in the nest of a woodpecker which has been deserted, or from which the rightful owner has been forcibly

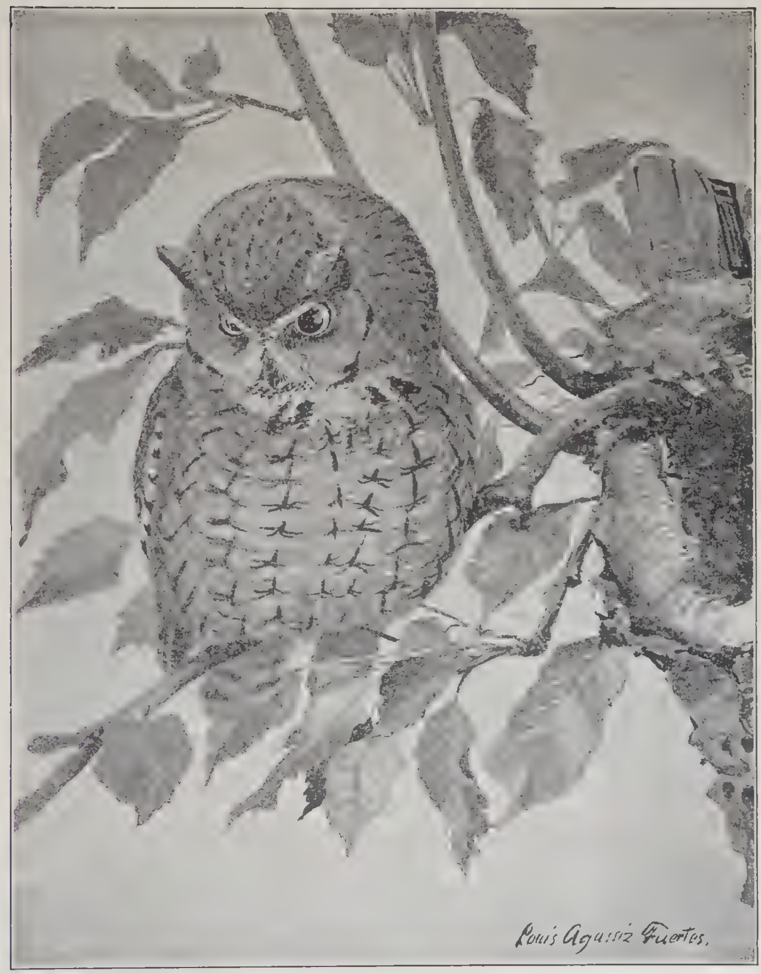
Louis Agassiz Fuertes.

Plate XXIX. Screech Owl.
Courtesy of National Committee of Audubon Societies.

expelled. The eggs are laid, in this latitude, from the middle of April to the middle of May, and they are commonly placed on the rubbish at the bottom of the cavity without any attempt at a nest. The birds are likely to use the same nesting place year after year, but apparently only a single brood is reared in a season. The eggs are pure white, unspotted, and average 1.42 by 1.19 inches.

The food of the Screech Owl is quite varied, but although small mammals, and especially mice, form a large and constant factor in its diet, it also catches a few birds (notably English Sparrows), and is very fond of insects and of crayfish. Probably its continued and increasing abundance in our larger towns and cities is due to the abundance of English Sparrows, on which it largely subsists during winter. Out of 212 stomachs reported upon by Dr. A. K. Fisher, 1 contained poultry; 38, other birds; 91, mice; 11, other mammals; 2, lizards; 4, frogs or toads; 1, fish; 100, insects; 5, spiders; 2, scorpions; 9, crayfish; 2, earthworms; 7, miscellaneous. Among the birds found in the stomachs there were remains of 21 sparrows, more than half of which were English Sparrows. The fondness of this owl for mice is well known, and it is probable that the farmer has no more valuable ally in his war against these pests than the common Screech Owl. Doubtless this little owl, which is notoriously courageous or even savage, does occasionally pick up a small chicken, but its opportunities for such harm must be very limited and the damage so done is infinitesimal.

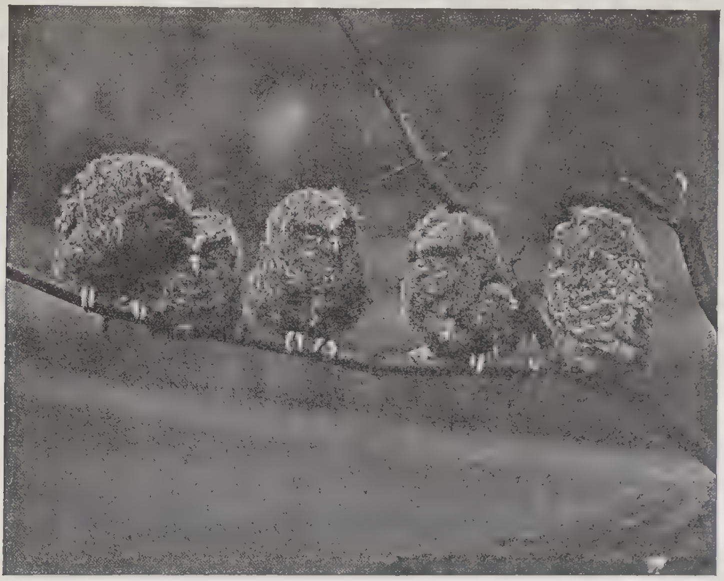

Fig. 81. Screech Owls. Young.

From photograph by C. Wm. Beebe. Courtesy of Bird Lore.

The remarkable differences in color which occur in this species, known as "dichromatic phases," seem to be entirely independent of age, sex or locality, and as yet no thoroughly satisfactory explanation has been given of the fact that among young of the same parents some may develop the red phase and others the gray phase, and this whether both parents are red, both gray, or one red and the other gray. It has been shown that in captivity the gray bird can be converted into a red one by feeding regularly with liver, and by withholding this food afterwards the bird has eventually resumed the gray plumage. This would seem to indicate that the color of the plumage may be largely influenced by the character of the food, yet it is difficult to see how this fact can be used to explain the conditions actually found in nature.

TECHNICAL DESCRIPTION.

Small; ear-tufts (plumicorns) large and conspicuous; four or five outer primaries emarginate or sinuate on inner webs; iris yellow; bill variable, but never white; toes scantily feathered toward their tips.

Adult in Gray Phase: Upper parts brownish-gray, more or less mottled with blackish, many feathers of the top of head and back with black shaft-streaks; outer edge of many scapulars white or whitish, forming two conspicuous light stripes down the back; facial disk gray with much dusky mottling, and bounded on its outer edge by a clear black border which is continued down the side of throat as a black stripe; under parts white or grayish white, with conspicuous black streaks and much finer and fainter wavy cross-bars of dusky or black; outer webs of wing feathers with numerous white or buffy spots or patches, the inner webs barred with blackish and gray; tail gray with six to eight narrow dusky bars.

Adult, Red Phase: Prevailing color bright rust-red, sometimes uniform above except for the white scapular stripes and an occasional blackish shaft line on forehead and scapulars; under parts mixed rust-red and white, usually with some black streaks, but sometimes all the markings very deep red; facial disk rusty gray, commonly bordered by black as in the normal phase; wing feathers and tail with same pattern as in normal bird, but the bars mainly of light and dark rusty, only partly blackish; bill reddish.

Between these two extremes of gray and red, are found intermediate forms of every possible gradation, but the size and proportions will always discriminate it from the Long-eared Owl, and the ear-tufts prevent confusion with any other.

Length 7.50 to 10 inches; wing 6 to 7.10; tail 3.05 to 3.50.

157. Great Horned Owl. Bubo virginianus virginianus (*Gmel.*). (375)

Synonyms: Virginia Horned Owl, Big Hoot Owl, Cat Owl.—Strix virginiana, Gmel., 1788, Wils., Aud.—Bubo virginianus, Bonap., Nutt.—Strix maximus, Bart., 1792.—Bubo pinicola, Vieill., 1807.

Plates XXX and XXXI.

Our largest common owl, readily identified by the conspicuous ear-tufts. Any tufted owl with a spread of wings of four or five feet may be safely identified as the Great Horned Owl, or its western variety, No. 158.

Distribution.—Eastern North America, west to the Mississippi Valley, and from Labrador south to Costa Rica.

Generally distributed throughout the state, but more abundant in the unsettled portions than elsewhere. As the country is cleared up and gunners become more numerous this species becomes less and less common, although doubtless a few pairs continue to rear their young even in the most populous districts as long as any considerable patches of timber remain. It appears to be resident wherever found and we know of nothing to indicate a migratory movement, the great abundance at certain seasons or during certain years being due probably to an increase in the total number of individuals, or possibly to a concentration brought about by favorable food conditions.

The Great Horned Owl is mainly nocturnal in its habits, but if found abroad during daylight appears to see fairly well and is usually a rather

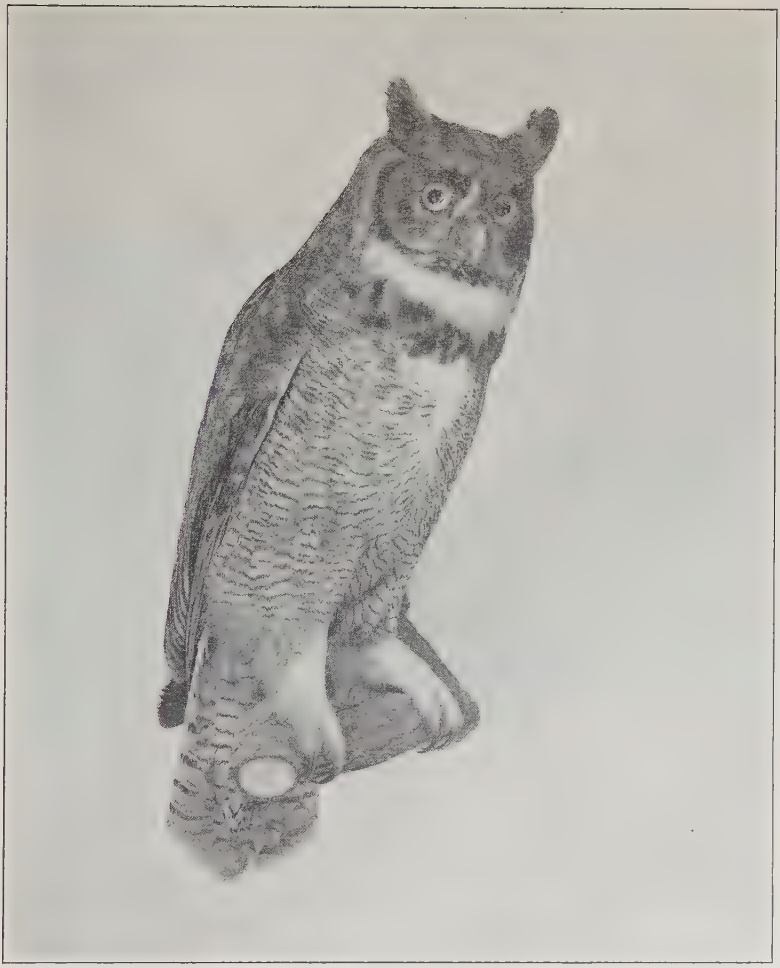

Plate XXX. Great Horned Owl. Adult.
Photograph from mounted specimen. (Original.)

Plate XXXI. Great Horned Owl. About six weeks old.

Photograph from life, by Dr. Thomas H. Jackson.

hard bird to approach, especially if once shot at or otherwise alarmed. Ordinarily it spends the day time in some hollow tree, or hidden amid the densest foliage, and appears to depend upon its protective coloration to escape the notice of enemies. Among its inveterate foes is the Crow, which takes delight in mobbing it and making its life miserable whenever it finds it abroad by daylight. The owl retaliates by raiding the crow roost at night and devouring a few of his persecutors. Apparently the crow is not a favorite food and is eaten only when other food is scarce.

The usual diet consists of partridges, quail, ducks, rabbits, squirrels, rats, and even fish, crayfish and insects. It is one of the very few enemies (aside from man) of the common skunk, and specimens are frequently taken whose plumage is rank with the odor of this animal. More rarely still it attacks the porcupine, and W. P. Melville has recorded the capture of a specimen at Windsor, Ont., in the winter of 1883-84, which had porcupine quills in its tongue, mouth and skin, as well as in the stomach, intestines and liver. Although it unquestionably does much good by destroying rats, mice and other harmful rodents, it is particularly fond of poultry and once it has visited a particular farm yard is almost certain to continue its attacks until captured or killed. An instance is recorded where one owner lost 59 young guinea-fowl in a single autumn by this owl. On the other hand, Mr. Chas. Dury states that in the neighborhood of a nest of these owls, in a sycamore stub near a farmer's barn, there were found the remains of 113 Norway rats, most of them with the heads split open and the brains removed.

Of 110 stomachs reported upon by Dr. A. K. Fisher, 31 contained poultry or game birds; 8, other birds; 13, mice; 65, other mammals; 1, a scorpion; 1, fish; and 10, insects. Among the mammals were hares, rabbits, squirrels of several kinds, skunks, musk-rats, weasels, gophers, rats and mice of various kinds, and even a few shrews. It has also been known to attack and kill the ground-hog or woodchuck occasionally. This is the only species of Michigan owl not protected under the present (1912) laws of the state, and in view of its destructiveness to game and poultry it doubtless was wise to make this exception in framing the law. It should be distinctly understood, however, that all other owls, large or small, are protected by the law, and their killing is prohibited under penalty of fine or imprisonment or both.

The Great Horned Owl nests very early in the season and probably with very few exceptions the eggs are laid in Michigan before the first of March. In many cases they are laid early in February and it is by no means unlikely that during mild winters some of the birds nest even in January. Sometimes a hollow tree is selected as a nesting place, but more often an open nest is built, or an old nest of hawk, crow or heron is repaired and the eggs laid therein· Such nests are almost always in large trees and at a considerable height from the ground. One of the parents is almost always found on the nest, a necessary precaution to prevent freezing of eggs or young, and it is no unusual thing to find the Great Horned Owl sitting patiently upon her nest although deeply covered by falling snow.

The eggs are commonly two, occasionally three, more rarely but one. They are always white and unspotted and appear to be decidedly small for the size of the bird; they average 2.12 by 1.81 inches. According to Major Bendire the eggs are laid at intervals of about three days, and the period of incubation is 28 days. There is considerable evidence, however, to show that much longer periods frequently elapse between the deposition of the two successive eggs, and frequently one or two young birds and an unhatched egg may be found in a nest together. It has been surmised that this is designed by the old bird as a matter of convenience, the warmth of the chicks protecting the freshly laid egg from freezing, so that the parent may be absent for longer intervals in search of food. This, however, seems to be merely an inference from a few observed facts. When first hatched the young are covered with white down, and although they grow rapidly they do not acquire their flight feathers until two months old and probably remain in the nest from two to three months after they are hatched.

According to Bendire "The common call which is most often uttered, and I believe that of the male, is a far-reaching 'too-hoot-too-hoot-too-hooh,' while the answering one of the female is shorter, and usually consists simply of a 'oo,' or 'to-oo.' Aside from these they have several others, one a cat-like squeal or cry like ,waah-hu,' and again a series of yelps similar to the barking of a dog." When heard at a little distance the hoot of this owl may easily be mistaken for the ordinary crossing whistle of a locomotive, and at times it bears quite a strong resemblance to the notes of the Morning Dove. When near at hand, however, the notes are too loud and harsh to be mistaken for anything else.

TECHNICAL DESCRIPTION.

Large; ear-tufts (plumicorns) very conspicuous; iris bright yellow; bill and claws black; toes fully feathered; first three or four primaries emarginate or sinuate on inner webs.

Adult: Upper parts mottled black, white and rusty (tawny), the latter the prevailing color beneath the surface, the superficial pattern made up of narrow, wavy or zigzag, white cross-bars, and wider black interspaces, giving the effect on head, neck and "cape" of a gray ground-color broadly and irregularly striped with black; facial disk brownish gray or rusty gray, with a broad black outer border and usually several concentric blackish lines; a conspicuous snow-white patch on the lower throat, forming an imperfect collar; rest of under parts white, broadly and irregularly streaked with black on the chest, and closely and evenly barred with black elsewhere, sometimes with a good deal of rufous intermixed; wing and tail feathers barred with gray and black, the tail showing about six distinct black bars.

Young: At first covered with snow-white down, which becomes buffy or even tawny, spotted and later barred with brown or dusky everywhere except on legs and feet; the wing and tail-feathers from the first have essentially the same colors and pattern as when adult; the ear-tufts are visible in the down of the half grown bird and the characteristic black border of the facial disk and white throat patch also appear at about the same age.

There is immense individual variation in adults, particularly as to the proportions of rufous, black, and white, and the coarseness of the pattern. Females are noticeably larger than males, but there seem to be no constant color differences.

Male: Length 18 to 23 inches; wing 14.50 to 15.25; tail about 8.25; weight about 3½ lbs.

Female: Length 22 to 25 inches; extent about 57; wing 16; tail 9.

158. Western Horned Owl. Bubo virginianus pallescens *Stone.* (375a)

Synonyms: The synonymy is so involved that it seems useless to attempt to untangle it here.

This western subspecies very closely resembles typical *virginianus*, but is characterized by a decidedly lighter tone of coloration and by somewhat smaller average size. The two forms, however, are separable only by the expert.

Distribution. -The distribution is given by the A. O. U. Check-list (1910) as western United States (exclusive of the higher mountains) from eastern Oregon, Montana, and Minnesota south to southeastern California, Arizona, New Mexico, western Texas, and northeastern Mexico.

This form, or its equivalent, has been included in several earlier lists, but the specimens upon which the claims were based are inaccessible and some doubt with regard to them remains. In the summer of 1904 the University of Michigan party took four specimens, one in Ontonagon county, July 26, and three on Isle Royale, August 26, which have been determined by Mr. Ridgway as *Bubo virginianus pallescens* Stone, of the new (1910) A. O. U. Check-list. Another specimen of the same race was taken by Mr. C. McLaughlin, at Robbins, Ontonagon county, January 5, 1906, and was determined by Mr. H. C. Oberholzer as *Bubo virginianus occidentalis* [Stone?] (Swales, Auk XXVII, 1910, 208), which would therefore seem to make this latter subspecies equivalent to *pallescens* of Stone (Auk XVIII, 1901, 300). In reply to an inquiry as to the status of these specimens Dr. C. W. Richmond, of the U. S. National Museum, writes, under date of December 1, 1911: "The Owls identified by Mr. Ridgway are *Bubo virginianus pallescens* of the new Check-list, but Mr. Oberholzer claims that *B. v. occidentalis* is a definite, recognizable form occupying the middle west (north of the range of true *pallescens*), and from his point of view the Michigan birds are *occidentalis*."

The habits of this subspecies, as observed by Mr. Peet, on Isle Royale, do not seem to differ much from those of the common Great Horned Owl. It seemed to feed mainly on white-footed mice and northern hares, both of which were abundant. It was not shy in the dusk of evening, but rather curious, perhaps because most of those seen were young, or because they had been little disturbed by man (Adams' Rep. on Isle Royale, Mich. Geol. Surv., 1908, 353).

159. Snowy Owl. Nyctea nyctea (*Linn.*). (376)

Synonyms: Arctic Owl, White Owl, Ermine Owl.—Strix nyctea, Linn., 1758, Vieill., Wils., Bonap., Aud.—Nyctea nivea, Cass.—Strix arctica, Bartr., 1792.—Nyctea scandiaca var. arctica, B. B. & R., 1875.

Figure 82.

Mainly snow white, but always more or less barred with brown; no ear-tufts or only mere traces; large.

Distribution.—Northern portions of northern hemisphere. In North America breeding wholly north of the United States; in winter migrating south to the middle states, straggling to South Carolina, Texas, California and Bermuda.

This beautiful owl, not to be mistaken for any other species, comes to us from the north late in autumn and is met with occasionally until early spring. Sometimes one is seen as early as the middle of October, but more often they do not come until late in November, and although a stray loiterer may be seen in April (St. Clair Flats, April 5, 1906, Taverner) the greater number retire to the north before the beginning of that month. Usually very few are seen, and in the interior of the state several winters may pass in any given locality without the record of a single one. They prefer the shores of the Great Lakes and the courses of the larger rivers, perhaps because they are decidedly fond of fish and these localities afford them a fairly good supply.

At long intervals they appear in much larger numbers, and several of these invasions have been recorded within the past thirty years. In the winter of 1876-77, they were unusually abundant over all the northern United States, being thus reported from localities where previously they had been extremely rare. Again in the winter of 1892-93, there was another large influx from the north, and in 1901-02 perhaps the largest invasion of all occurred. On this last occasion they appeared in such numbers that they ceased to be rare and specimens were often seen for sale in markets along with ducks and other birds, the taxidermists in the larger cities being already so well supplied with specimens that they would not purchase more. Mr. Peter Lepp, of Saginaw, told us that during that winter he had forty-two Snowy Owls sent in to be mounted, coming from all over the northern half of the Lower Peninsula, though many of them were from the immediate vicinity of Saginaw. Mr. W. L. Kress, of Elk Rapids, mounted twenty-eight during the winter, and thinks at least fifty were killed in the immediate vicinity. He says they almost completely destroyed the quail and partridges in that county. Mr. J. H. Fleming, of Toronto, Ont., estimated that at least 1,000 were killed in Ontario during this remarkable flight. He states that "during March, 1902, the females disappeared and were replaced in April by the returning flight of the light-colored birds (apparently all males). A few remained about Toronto Marsh all through May and a small, light-colored male was taken on June 7. It was in excellent condition and showed no signs of being a wounded bird."

This owl appears to see perfectly well by day and hunts freely by daylight. It is said never to take prey which is not in motion, with the exception of fish, which it will pick up wherever found. It flies with remarkable swiftness and is able to overtake and capture ducks, grouse, quail and other quick flying birds.

It nests only in the far north, the southernmost breeding record apparently being about 53°, in Labrador. Its eggs were found by Fielden, June 20, 1876, on Grinnell Island, latitude 82° 40′ north, probably the most northern nesting record for this species. The nest, if such it can be called, is commonly placed on the ground, usually on some slight elevation, and consists of a mere hollow in the ground with a few leaves, grasses, and stray feathers for a lining. Normally the eggs are from five to seven, but as many as ten have been found. They are oblong oval, never as round as those of the Great Horned Owl, roughly granular, and have no luster. Usually they are clear white and unspotted, but occasionally they are pale cream color. They average 2.24 by 1.76 inches.

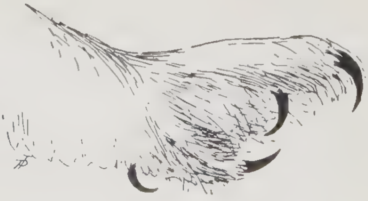

Fig. 82. Foot of Snowy Owl. (Original.)

Arctic travelers state that a few of these owls remain all winter within the Arctic Circle, but the great majority move southward at the approach of cold weather, only returning in the summer time to nest.

While with us they feed largely upon game birds, including partridges, quail, and ducks, but also on rabbits, rats and mice, and probably also on muskrats and squirrels. As noted before, they are very fond of fish and are said to be expert at catching them alive. They, however, eat dead fish washed up on the shore when other food is scarce.

TECHNICAL DESCRIPTION.

Large; ear-tufts (plumicorns) almost or quite lacking; iris yellow; bill blue-black; four or five outer primaries emarginate or sinuate on inner webs near tip; feet densely covered with hair-like feathers, hiding the black claws; plumage largely pure white.

Adult male: Plumage nearly white, sometimes quite so except for a few dark spots and bars on head, back and scapulars; as usually seen the upper parts are freely barred with dark brown or slate on a pure white background, while the belly, sides and flanks are similarly marked, but the throat and breast pure white, unspotted; wings also freely spotted and barred with black; tail mainly white, but middle feathers with several blackish bars and the rest with one or more dark spots near tip.

Adult female: Similar, but much darker; heavily spotted and barred, above and below, with dark brown or blackish, only the throat, breast and feet unmarked; tail usually with three or four dark bars.

Male: Length 20 to 23 inches; wing 15.50 to 17.30; tail 9 to 9.70. Female: Length 23 to 27 inches; wing 17.30 to 18.70; tail 9.70 to 10.30.

160. Hawk Owl. Surnia ulula caparoch (*Mull.*). (377a)

Synonyms: American Hawk Owl, Day Owl, Canadian Owl, Hudsonian Owl.—Strix caparoch, Müll., 1766.—Strix hudsonia, Gmel., Wils., Shaw.—Strix canadensis Briss.—Strix funerea, Rich. & Sw., Aud., Bonap.—Surnia ulula var. hudsonica, Ridgw.

Figure 83.

Known by its medium size, lack of ear-tufts, long, rounded tail, and dark brown-and-white-barred breast.

Distribution.—Arctic America, breeding from Newfoundland northward, and migrating in winter to the northern border of the United States. Occasional in England.

A winter visitor from the wooded regions of the far north, where it nests in April or May in hollows of trees, or in open nests of twigs and moss in evergreens. It lays from three to seven white unspotted eggs which average 1.51 by 1.23 inches, and closely resemble the eggs of the Short-eared Owl.

It is one of our rarest owls, but like the Snowy Owl, occasionally appears in something like abundance. We have no record in Michigan of such an occurrence, but in October and November 1884, a wave of these birds visited northern New England and scores, possibly hundreds, of specimens were taken; one taxidermist at Bangor, Me., receiving 28 freshly killed specimens within a few weeks (Brewster).

It may be looked for in the northern third of Michigan from the last of October until the latter part of winter, but it appears to retire northward much earlier than the Snowy Owl, few if any, lingering later than February. As it hunts freely by daylight, and is not particularly shy, it should be easily recognized. It perches like a hawk on the top of some dead stub or isolated tree. from which it watches for its prey, which consists mainly of mice,

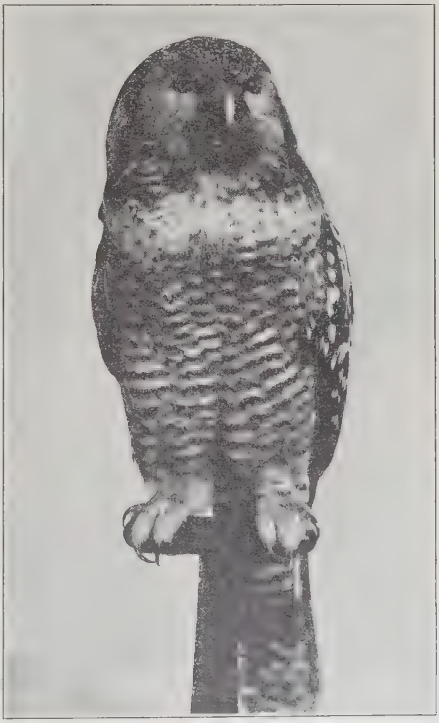

Fig. 83. Hawk Owl.
From photograph of mounted specimen.
(Original.)

squirrels and birds, though it is said to eat insects freely in its summer home.

Specimens are not numerous in our collections. The Agricultural College Museum has three, one taken by Major Boies on Neebish Island, October 27, 1894, and two taken in Mackinac county, near Trout Lake, by the late Percy Selous, one November 5, and the other November 10, 1896. Prof. H. L. Clark writes us that there is a specimen in the Olivet College museum which was killed there, and in 1903 we saw two mounted specimens in a store at Sault Ste. Marie, which were killed near by. One was killed at Port Huron about November 17, 1905, and another November 6, 1906, and mounted by Eppinger of Detroit. Mr. Albert Hirzel, Forestville, Sanilac county, mounted one in December 1906, which was killed in the Upper Peninsula.

The nesting ground of this species lies mainly north of the United States, but in 1905 members of a biological survey party from the University of Michigan took a young bird, able to fly, but still partly "in the down," making it very probable that it was reared in the vicinity. The locality was Isle Royale, Lake Superior, and the date August 4, 1905. An adult Hawk Owl was seen near by but was too wary to be taken Adams, Ecological Survey of Isle Royale, 1905, pp. 92, 353. Annual Rep. Mich. Board of Geol. Survey, 1908).

TECHNICAL DESCRIPTION.

Rather small; ear-tufts (plumicorns) lacking; facial disk poorly developed, making the face hawk-like; feet heavily feathered; outer three or four primaries emarginate on inner webs; tail strongly graduated; iris deep yellow; beak nearly white; claws black.

Adult: Top of head black, thickly sprinkled with small rounded, pure white dots; cheeks white or grayish white, bounded posteriorly by a broad black bar or stripe which extends downward on the side of the throat, meeting its fellow from the other side, thus forming a black collar; two other black stripes bound the sides of the occiput and hind neck; rest of upper parts chocolate brown to sooty black, profusely spotted with white, the spots running into a rather conspicuous bar on the outer edge of the scapulars on each side; under parts regularly and closely barred with pure white and brown or blackish, except across the chest where the dark bars are scanty or wanting; tail like the back, each feather with paired white spots, forming about five or six narrow white bars.

Young: Much browner or more buffy, with fewer spots above, and the barring below more indistinct.

Length 14.75 to 17.50 inches; wing about 9; tail 6.80 to 7.

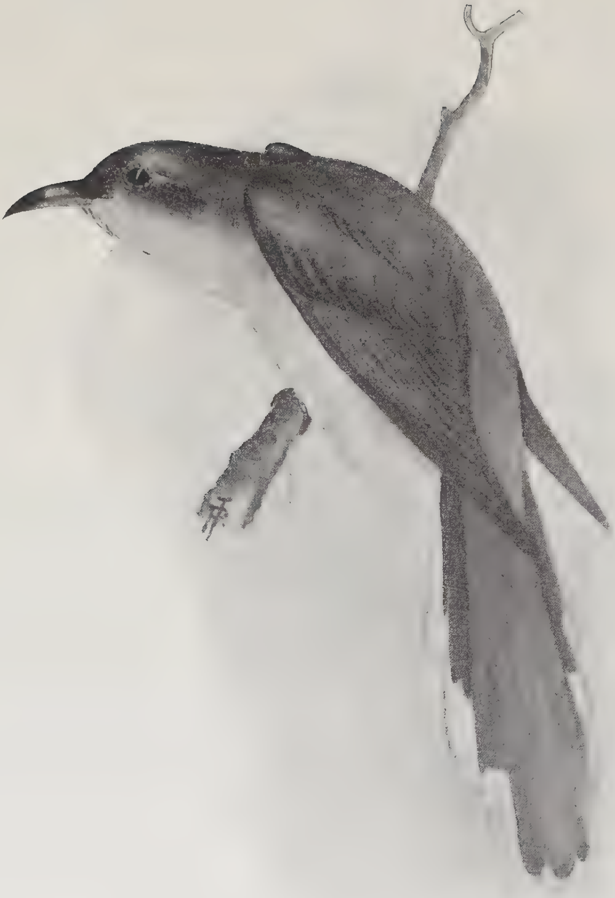

Plate XXXII. Yellow-billed Cuckoo.

From original drawing by P. A. Taverner.

Order XIV. COCCYGES. Cuckoos, Kingfishers, etc.

KEY TO FAMILIES.

A. Toes two before and two behind, the front toes separate to the base; bill about as long as head. Family 43. Cuculidæ. Cuckoos. (Only two Michigan species).

AA. Toes three in front and one behind, two of the front toes grown together for half their length; bill longer than head, its cutting edges minutely saw-toothed. Family 45. Alcedinidæ. Kingfishers. (Only one Michigan species).

Family 43. CUCULIDÆ. Cuckoos.

KEY TO SPECIES.

A. Basal half of lower mandible yellow; most of the tail-feathers white tipped, the outer ones for an inch or more (Fig. 84). Yellow-billed Cuckoo. No. 161.

AA. Bill all black; tail-feathers with narrow white tips, the longest tip not half an inch (Fig. 86). Black-billed Cuckoo. No. 162.

161. Yellow-billed Cuckoo. Coccyzus americanus americanus (*Linn.*). **(387)**

Synonyms: Rain-crow, Rain-dove, Kow-Kow, Chow-Chow.—Cuculus americanus, Linn., 1758.—Coccyzus americanus, Bonap., 1824, and authors generally.

Plate XXXII and Figures 84, 85.

Reference to the plate will serve to separate the cuckoo from all other birds, and the present species may be known from the only other Michigan cuckoo by the yellow lower jaw, the cinnamon in the wings, and the large white "thumb-marks" on the outer tail-feathers (Compare figures 84 and 86).

Distribution.—Eastern temperate North America, breeding from Florida north to New Brunswick, Canada, and Minnesota, west to the eastern border of the Plains, and south in winter to Costa Rica and the West Indies.

The Yellow-billed Cuckoo is generally distributed throughout the state but probably is somewhat less common in the northern sections than farther south; it is, however, nowhere abundant and although at the proper season you may see or hear cuckoos almost any day or night, it would be difficult in most places to find half a dozen specimens in a half day's hunting. The two species of cuckoo are so similar in general appearance and so often confounded that most of our notes for the state are badly mixed and

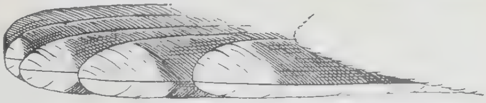

Fig. 84. Outer tail-feathers of Yellow-billed Cuckoo. From Hoffmann's Guide. Courtesy of Houghton, Mifflin & Co.

it is not possible to generalize safely in regard to either species. They seem to arrive from the south at about the same time, which is early in May in the southern part of the state and from five to ten days later in the Upper Peninsula. Average dates for Detroit and Lansing will range from May 10th to 20th.

This is one of the birds whose voice is often heard at night and its usual call, *coo-coo-coo*, or *kuk-kuk-kuk*, is common to both species and is familiar to most outdoor people. Both the cuckoos have numerous variations of this call, and several entirely distinct notes, but our best observers are unwilling to assign any one of these notes exclusively to either species, and we know of no characteristic note belonging to the Yellow-billed Cuckoo.

Nest building begins ordinarily in June, but not commonly until the middle of the month or even later. According to Bendire "In the northern part of its range the breeding season is at its height during the latter part of June and the first week of July, and here one brood only is reared, while in the south they sometimes raise two." The nest is a very simple affair, consisting of a little platform of twigs, leaf-stems, and perhaps a few catkins, slightly hollowed to receive the eggs, and lodged rather than placed in the crotch of a bush, among a tangle of vines, or sometimes on the horizontal spreading branch of an evergreen. Not infrequently the old nest of some other bird is used with only slight repairs or additions. The eggs are three to five, pale blue, often more or less nest-stained, and always unspotted, though frequently clouded or "water-marked" in a manner which is easily recognized but not readily described. They average 1.21 by .88 inches.

It seems to be a fact that the two species of cuckoos not infrequently lay their eggs in each others nests, and this by many is considered a relic of the parasitic habit so strongly developed in the old world cuckoos, which usually build no nests of their own, but impose the care of their eggs and young on other and mostly smaller birds. Single cuckoos eggs are not infrequently found in the nests of other birds here in Michigan, but not more often perhaps than we find eggs of the Robin, blackbirds and some sparrows. In this connection it should be noted that comparatively fresh eggs and newly hatched young are sometimes found in the same nest, although as a general rule the set is completed before incubation begins. It is difficult to believe that only one brood is reared in Michigan each season, since eggs are common in June and all through July and August, even a few sets being found in September. It is possible that these are merely second layings by birds which have been unfortunate with their first nests, but it seems much more likely that many individuals rear two broods

The food of this cuckoo consists very largely of insects, and probably we have no bird which is more valuable to the orchardist and fruit grower. The careful studies made by the Department of Agriculture at Washington have shown that more than 75 percent of the food consists of insects, and these are almost all of injurious kinds. It is particularly fond of caterpillars and appears to delight in those forms which are covered with hairs and spines. It is a common thing to see a cuckoo perch near a nest of tent caterpillars (*Clisiocampa*), and quietly swallow one caterpillar after another until seven or eight have been taken, then rest for half a minute or more before eating an equal number, repeating this action several times until the appetite is satisfied or the supply of caterpillars exhausted. In several instances more than one hundred tent caterpillars have been taken from a single cuckoo's stomach, and the bird is almost equally destructive to various other hairy caterpillars. Even those caterpillars which are covered with protective stinging hairs, like the *Io* caterpillar and the various species of *Vanessa*, are eaten freely. Large quantities of beetles and bugs also are consumed, and both species of cuckoo seem to be very fond of grasshoppers, eating especially such forms as frequent shrubbery and trees, among these the destructive tree crickets (*Œcanthus*). Ten specimens examined by Professor Aughey, in Nebraska, contained 416 locusts and grasshoppers, and 152 other insects.

In Michigan the cuckoos seem to eat very little fruit, but farther south they have been known to feed freely on elder-berries and mulberries, and they doubtless eat other small fruits to some extent. They, however, never become actual enemies of the horticulturist in this way.

The only serious charge ever brought against the cuckoo, so far as we know, is that of robbing the nests of other birds. This crime was ascribed to the bird years ago, and several of the older writers have adduced some proof in support of it. Audubon, Wilson and Nuttall all state that the cuckoo is known to suck the eggs of other birds, and one would infer from their statements that considerable damage was done in this way. Recent observers, however, have pretty generally failed to corroborate these statements, and several of our best naturalists, whose opportunities for observation have been ample, state positively that they see no reason to believe these charges. Personally, the only evidence of this habit which we have seen lies in the fact that many species of the smaller birds attack the cuckoo and drive it away from their nests, even following it some distance and treating it very much as they would Crows, Blue Jays and Bronzed Grackles, which are known sometimes to rob nests. These actions, however, are susceptible of another explanation, for in flight and general appearance the cuckoo is not unlike some of the smaller hawks and very possibly other birds may mistake them for birds of prey.

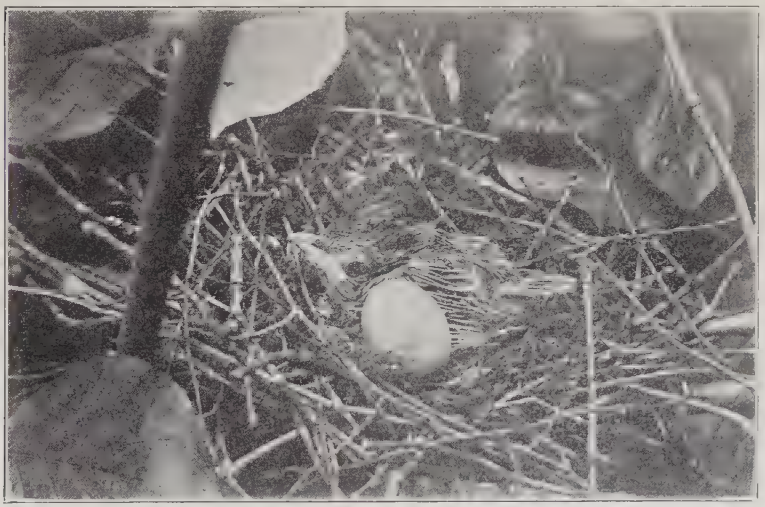

Fig. 85. Nest, egg and young of Yellow-billed Cuckoo.

From photograph by Thomas L. Hankinson.

TECHNICAL DESCRIPTION.

Toes two in front, two behind; tail of long, soft feathers, much graduated.

Adult: Upper mandible mainly black, its edges and most of the lower mandible yellow; entire upper parts brownish gray or olive gray, often with a bronzy luster; under parts pure white; inner webs of most of the primaries rufous or cinnamon; middle tail-feathers like the back, the rest black with abrupt and broad white tips. Young: Similar, but feathers of upper parts usually with rusty or ashy tips, and tail-feathers with smaller and less abrupt white patches.

Length 11 to 12.70 inches; wing 5.40 to 5.80; tail 6 to 6.15.

162. Black-billed Cuckoo. Coccyzus erythropthalmus (*Wils.*). (388)

Synonyms: Rain Crow, Kow-Kow.—Cuculus erythrophthalmus, Wils., 1811, and authors generally.

Figure 86.

So similar to the Yellow-billed Cuckoo in appearance, habits and note that the two are very generally confused. The present species shows no yellow on the bill, which is nearly black, has a circle of bare red skin about the eye, little or no cinnamon in the wing, and the outer tail-feathers only lightly tipped with white. (Compare figures 84 and 86.)

Distribution.—Eastern North America, west to the Rocky Mountains, breeding north to Labrador, Manitoba and eastern Assiniboia; south, in winter, to the West Indies and the valley of the Amazon.

In Michigan the Black-billed Cuckoo has nearly the same distribution as the Yellow-billed Cuckoo, except that it is equally abundant all over the state, whereas the Yellow-billed species is apparently less common in the northern half. The two species are also so similar in general habits that most of what has been written in the preceding pages is applicable to the present bird. It arrives from the south at about the same time, nests in much the same way and at the same time, and moves southward again in the fall together with the Yellow-billed species.

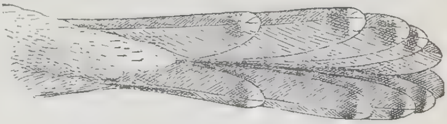

Fig. 86. Tail of Black-billed Cuckoo.
From Hoffmann's Guide.
Courtesy of Houghton, Mifflin & Co.

Although a few field naturalists profess to be able to discriminate the notes of the two species, most good observers agree that this is impossible. Bendire says that it is impossible to distinguish its call notes positively from those of the Yellow-billed Cuckoo, and Mr. E. P. Bicknell, one of our best authorities on the notes of birds, states that he has been unable to find any constant differences. The nests of the two species are likewise extremely similar, but the Black-billed is the smaller bird and lays the smaller egg; moreover the eggs average deeper in color, the shade being described by Ridgway as glaucous-green or verditer-blue. They average 1.11 by .78 inches, and usually present the peculiar mottled appearance already mentioned under the preceding species.

This bird has been charged with robbing the nests of other birds, precisely as in the case of the Yellow-billed Cuckoo, and although the charge lacks recent substantiation there may be some truth in the accusation. On the other hand, it is equally destructive to injurious insects, on which it feeds constantly and voraciously, consuming immense numbers of hairy caterpillars, bugs, beetles, grasshoppers and other injurious species. A single bird was shot in an oat field infested with army worms near Ellsworth, McLean county, Ill., and when examined by Prof. S. A. Forbes, 95 percent of the food in its stomach consisted of army worms (Trans. Ill. State Hort. Soc., Vol. 15, 1881, p. 129).

It certainly is one of our most valuable birds and it is to be regretted that it is not more numerous. Although generally distributed, and nowhere rare, it nevertheless is nowhere abundant. It seems probable that with us it rears two broods during the season, but exact data on this point are very desirable. It seems to be a little more careless than the Yellow-billed Cuckoo in regard to its eggs, which are frequently found in the nests of the Yellow-billed Cuckoo, and less often, but occasionally, in those of other birds. Mr. J. G. Davidson, of Lockport, N. Y., says that in Niagara county, N. Y., on June 17, 1882, he "found a Black-billed Cuckoo and a Mourning Dove sitting together on a Robin's nest. The cuckoo was the first to leave the nest, which contained two eggs of the cuckoo and one of the Robin (all somewhat incubated), and two of the dove, perfectly fresh" (Bendire, I, 141).

F. S. Shuver, of Bangor, Mich., says: "It seems in this locality to nest very commonly late in the fall, as every year I find several nests. On September 14, 1897, I found a Black-billed Cuckoo sitting on four fresh eggs. I stepped up and examined the nest, and the bird, true to its habit, at once abandoned the nest. On September 3, 1894, I found a nest of this cuckoo in a large spice bush, and as the heavy frosts had taken the leaves from the bushes, I watched it from a distance without disturbing it. On September 12, I found four young birds and an addled egg in the nest. The birds cared for the young until the 18th, when a very cold autumn rain began; they then deserted their brood and were not seen again" (Bull. Mich. Ornith. Club, II, 1898, 16).

TECHNICAL DESCRIPTION.

Similar to the Yellow-billed Cuckoo, but bill entirely blackish, or with merely a yellowish tinge at the base of the lower mandible; edge of eyelid bright red (but iris brown); tail-feathers (except middle pair, which are like the back) grayish brown, with a sub-terminal darker bar, and narrow white tips; chin, throat and upper breast grayish white, often with a buffy tinge; rest of under parts pure white; wing-feathers without rufous on inner webs.

Young: Similar, but duller brown above, the eyelids dull yellow instead of red.

Length 11 to 12.70 inches; wing 5.12 to 5.65; tail 6.25 to 7.

Family 45. ALCEDINIDÆ. Kingfishers.

Only a single representative occurs in Michigan.

163. Kingfisher. Ceryle alcyon (*Linn.*). (390)

Synonyms: Belted Kingfisher.—Alcedo alcyon, Linn., 1758, Wils., 1811, Aud., 1831. —Ceryle alcyon, Boie, 1828, and authors generally.

Figures 87 and 88.

One of our few birds in which blue predominates; possibly to be mistaken for the Blue Jay by the beginner, but readily separated by a glance at figures 87 and 98, and by noticing that the bill is nearly two inches long in the Kingfisher and the feet very small, while the Blue Jay has a moderate bill and large feet.

Distribution.—North America, from the Arctic Ocean south to Panama and the West Indies, Breeds from the southern border of the United States northward.

In Michigan the Kingfisher is universally distributed, and though nowhere abundant is so conspicuous in plumage and note that it may always be readily found. It frequents the borders of ponds, streams, large and small, and the Great Lakes, and is frequently to be seen perched upon the pile of a wharf, the mast or boom of a vessel, the peak of a boat-house, a dead stub standing in the water, or the overhanging branch of some convenient tree. The note is a vigorous and prolonged rattle, startlingly loud and harsh when close at hand, but not unpleasant when heard at a distance. It is not to be mistaken for the call of any other bird and bears a close resemblance to the sound made by the old-fashioned watchman's rattle.

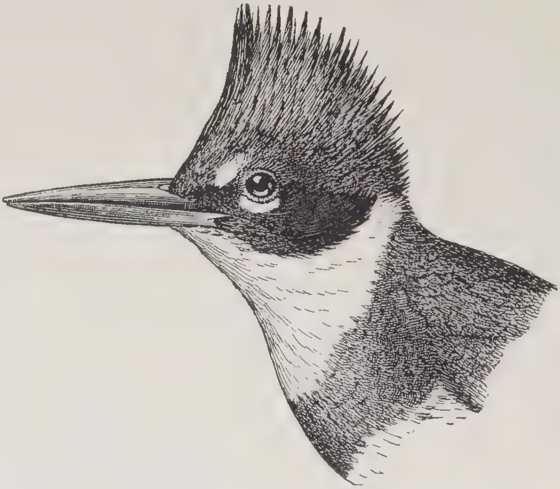

Fig. 87. Kingfisher.
From Hoffmann's Guide. Courtesy of Houghton, Mifflin & Co.

In fishing the Kingfisher poises on quickly beating wings at a height of from ten to twenty-five feet above the surface of the water, with the body at an angle of perhaps 45°, but the bill pointed downward and the eyes scanning an the water intently, watching for the approach of a fish toward the surface. When a favorable opportunity presents itself the wings are partially closed and the bird drops head foremost into the water with a splash, usually capturing the small fish in the bill. Sometimes this is swallowed at once, but more often it is carried away to some nearby perch where it is beaten for a few moments until dead, and then either swallowed entire or carried away to the nest to be fed to mate or young.

The nest is always a burrow in a bank of sand, gravel, or gravel and clay, sometimes only three or four feet in length, but more often from five to eight feet. At the end of the burrow is a somewhat enlarged chamber where the eggs are laid, often on the bare sand, but frequently on a collection of scales and bones of fish, the shells of crayfish, or similar skeletal material which has been ejected as pellets by the birds. The eggs vary in number from four to eight, but are commonly about six. They are pure white, unspotted, and usually a short oval, sometimes approaching the spherical. They average 1.36 by 1.05 inches.

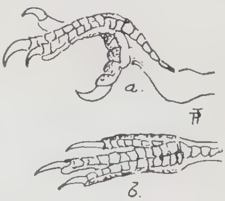

Fig. 88.
Foot of Kingfisher.
(Original.)

The food of the Kingfisher consists very largely of fish, which are mainly the young of shallow water species, principally minnows, chubs and related fish. Much complaint is made by fishermen about the damage done by the Kingfisher, but this is almost entirely imaginary. In a few cases persons who are raising gold fish, trout and other fish in large quantities, and in exposed situations, may suffer somewhat from the visits of the Kingfisher, but the harm done on open streams and ponds is infinitesimal.

Besides fish the Kingfisher eats large numbers of crayfish, some frogs (mainly when fish are scarce), and many insects. Professor Aughey, of Nebraska, writes "One that was sent to me to identify in September, 1874, had 18 locusts, in addition to portions of some fish, in its stomach. One that I opened in September, 1876, had mingled at least 14 locusts with his fish diet" (1st Rep. U. S. Entom. Com., App. 2, p. 39). Another writer records taking from a Kingfisher's stomach "fragments of various beetles belonging to the families Carabidæ, Dytiscidæ and Scarabœidæ." Larvæ of these beetles, particularly those of the Dytiscidæ, are known to destroy immense numbers of newly hatched trout, and the good done by the Kingfisher in consuming the beetles undoubtedly more than offsets any slight harm it may do in catching young trout. Probably it is not markedly beneficial, but it is a beautiful bird, whose presence adds much to the pleasure of the summer resorts, and its absence would be keenly felt by the nature lover. The custom of shooting the Kingfisher on sight, and including it in the list of birds which may be killed in the competitive hunting matches which are in vogue in some parts of the country, cannot be too strongly deplored. The present law of the state protects the Kingfisher at all seasons and this law should be rigidly enforced.

The Kingfisher arrives early from the south, usually in March, or by the time the ice is out of the streams. It lingers in the fall until the waters which it commonly frequents begin to freeze over, when most of the birds move southward, although a few occasionally remain all winter in favorable localities. During prolonged rough weather, when fish can be seen with difficulty, the Kingfisher is said to suffer much from hunger, and in such cases always resorts to other food, even trying to catch mice, according to Bendire. The latter writer also records one instance in which a Kingfisher was seen to greedily devour the berries of the sourgum (Nyssa aquatica).

At the south the eggs are laid in April, while in the Arctic Circle they may not be laid until the latter part of June. The male often digs a shallow burrow near the one occupird by his mate and uses this for roosting at night. According to Bendire only one brood is reared in a season, and the period of incubation is about sixteen days. The female alone incubates, but the male carries food to her at frequent intervals. For some time after the young leave the nest they are dependent on the old birds for at least a part of their food; but some of the stories as to methods employed by the old birds in teaching the young to fish must be taken with a very large grain of allowance.

TECHNICAL DESCRIPTION.

Bill long, strong, sharp, with a keel on the ridge, the edges of both mandibles minutely barbed backward, like the tip of a porcupine quill, evidently for the purpose of holding the slippery prey; feet small and weak, the three front toes largely grown together (syndactylous), the sole much flattened, the tibia bare above the heel; head strongly crested; iris dark brown; bill black.

Adult male: Above, clear leaden blue (plumbeous), the conspicuous double crest with most feathers darkening at the tips; a small white spot in front of eye; chin, throat and collar about the neck, pure white; a broad lead-blue band across the chest; belly and under tail-coverts white; primaries largely white on the inner webs toward the base; both primaries and secondaries often white-tipped, the latter always with white bars on the inner webs; tail with numerous paired white spots, forming 8 to 10 narrow white bars.

Adult female: Similar, but with a more or less complete chestnut band across the belly, this color also extending along the sides and flanks. Young birds of either sex have the blue chest band more or less mixed with brown or rufous.

Length 11 to 14.50 inches; wing 6 to 6.50; tail 3.80 to 4.30; culmen 2 or more.

Order XV. PICI. Woodpeckers, Wrynecks, etc.

(Only the Woodpeckers are found in America.)

Family 46. PICIDÆ. Woodpeckers.

KEY TO SPECIES.

- A. Very large, wing more than 8½ inches. Log-Cock. No. 169.
- AA. Smaller, wing less than 7 inches. B, B.
  - B. Back and rump shiny black, without any white markings; the top of head with or without a golden yellow patch; only three toes, two in front. Black-backed Three-toed Woodpecker. No. 167.
  - BB. Back or rump always with white; head often with red, but never with yellow; toes four, two in front and two behind (Fig. 90). C, CC.
    - C. Shafts of wing-feathers golden yellow; breast and sides with numerous clean cut, round, black spots. Flicker. No. 172.
    - CC. Shafts of wing-feathers not yellow, no round black spots on breast or sides. D, DD.
      - D. Middle pair of tail-feathers largely white on inner webs. E, EE.
        - E. A large black patch on chest. Sapsucker. No. 168.
        - EE. No black on chest. Red-bellied Woodpecker. No. 171.
      - DD. Middle pair of tail-feathers wholly black. F, FF.
        - F. Entire head, neck and chest red. Red-headed Woodpecker (adult). No. 170.
        - FF. Red only on the nape, if at all. G, GG.
          - G. Under parts all white. H, HH.
            - H. Wing 4½ inches or more; outer tail-feathers white, without cross bars. Hairy Woodpecker and Northern Hairy Woodpecker. Nos. 164, 165.
            - HH. Wing less than 4½ inches; outer tail-feathers white, barred with black. Downy Woodpecker. No. 166.
          - GG. Throat, chest and sides gray, more or less streaked or mottled with blackish; sometimes a few scattered red feathers about head and neck. Red-headed Woodpecker (young). No. 170.

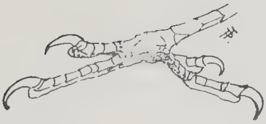

Fig. 90.

164. Hairy Woodpecker. Dryobates villosus villosus (*Linn.*). (393)

Synonyms: Guinea Woodpecker, Sapsucker or Big Sapsucker (incorrect).—Picus villosus, Linn., 1766, and authors generally.

The pure white under parts, black back with median white stripe, and checkered black and white wings are distinctive of this and the Downy

Woodpecker, which are separable only by size, the Hairy being at least twice as heavy as the Downy. In each the male has a scarlet nape patch which the female lacks.

Distribution.—Northern and middle portions of the eastern United States from Atlantic coast to the Great Plains.

In Michigan this is a common woodpecker wherever there is any considerable amount of woodland, but the bird is also seen during the colder half of the year in orchards and groves at considerable distances from large tracts of timber. It is commonly considered a resident wherever found, but certainly there is a well marked movement southward in the fall, since we have numerous reports from southern and southeastern Michigan to the effect that it is much more common in winter than in summer. Although widely distributed and nowhere rare, it is never really abundant; it is also rather a solitary bird, seldom seen except singly or in pairs, although for a few weeks after the young leave the nest family parties of four to seven may be encountered once in a while.

It nests early in the season, and eggs may be found from the last week in April to the middle of May according to latitude. Fully fledged young are abroad the first week in July, or somewhat earlier in the southern part of the state. The nest is a neat hole dug by the birds themselves in the dead wood of a trunk or limb, usually at some little height above the ground. In some regions maple seems to be preferred, but nests are often found in willow, poplar, and other soft wood trees. According to Bendire the eggs are usually four, sometimes three or five, rarely if ever more. They are pure white, unspotted, polished, like the eggs of all woodpeckers, and average .93 by .69 inches.

The food of this species is very similar to that of the Downy Woodpecker, but is of less account to the orchardist, since the present species is less often found outside continuous woods. According to Beal, who reported on 82 stomachs examined at the Department of Agriculture, in Washington, 68 percent of the food consisted of animal matter and 31 percent of vegetable matter. Insects formed 63 percent of the food, divided as follows: 17 percent ants; 24 percent beetles; 21 percent caterpillars; and 1 percent miscellaneous, including a few plant lice or aphids. Spiders and myriapods formed 4 percent of the food.

The vegetable matter, 31 percent in all, consisted mostly of wild fruits and a few seeds, with about 8 percent of vegetable rubbish. The fruits most freely eaten were dogwood, Virginia creeper, June berries, strawberries, poke berries and sumac berries, both poisonous and non-poisonous. Eight stomachs contained the seeds of sumac and the distribution of these poisonous seeds seems to be the only harm done by this bird.

It cannot be claimed that the consumption of insects confers any great benefit upon the agriculturist, since although the percentage of beetles is very large, and many of them are boring beetles, they are all species which work only in dead wood, thus doing practically no harm. A good many caterpillars (21 per cent) are eaten, and about 17 percent of ants, the latter item having very little economic significance.

This bird and the Downy Woodpecker are wrongly called sapsuckers in many parts of the state, being confused with the Yellow-bellied Woodpecker or true Sapsucker, which drills the bark of living trees in order to eat the sweet inner bark (cambium) and drink the sap. Neither the Hairy Woodpecker nor the Downy has this habit, and when seen about fruit or shade trees they are never injuring them, and usually it is safe to assume that they are eating some of the insect pests which might otherwise damage the trees.

Bendire describes its note as a shrill and rattling sound like *trriii, trriii*, or when flying from tree to tree several loud notes like *huip, huip*. Like all our woodpeckers it is very fond of drumming or tattooing on a hollow stub or any resonant object. An expert might possibly discriminate the tattoo of the present species from the rest, but the ordinary observer would notice little difference.

TECHNICAL DESCRIPTION.

Upper parts mainly black, the middle of the back striped with white; a white stripe over and behind the eye, sometimes continued across the occiput in front of the conspicuous scarlet crescent which adorns the nape; nasal bristles white or grayish white; ear-coverts (auriculars) black; bordered below by a white stripe, which in turn is bounded below by a black stripe running from base of lower mandible to shoulder; entire under parts pure white; wings and coverts black, freely spotted with white; middle tail-feathers black, the outer pair entirely white, the rest black and white.

Adult female: Precisely like the male, except that there is no red on the nape. Young males resemble the adult female.

Length 8.50 to 9 inches; wing 4.50 to 5; tail 3.10 to 3.60; culmen 1.18 to 1.35.

165. Northern Hairy Woodpecker. Dryobates villosus leucomelas (*Bodd.*). (393a)

Synonyms: Picus leucomelas, Bodd., 1783.—Picus canadensis, Gmel., Lath., Aud., Bonap.—Picus septentrionalis, Nutt., 1840.

This is the northern form of the Hairy Woodpecker, characterized by somewhat larger size and a larger proportion of white in the plumage. It intergrades with the common Hairy Woodpecker, and suspected specimens should be submitted to an expert for identification. It is not safe to assume that every Hairy Woodpecker taken within the range assigned to *leucomelas* belongs to this subspecies.

Distribution.—Northern North America, south to about the northern border of the United States.

Assuming that there is a southward movement of many individuals in winter we should expect this race to occur in the Upper Peninsula and the higher parts of the Lower Peninsula during winter, and it is not impossible that it may prove to breed occasionally in favorable localities in these regions. The only actual records, however, of which we know are those obtained by the expedition of the University of Michigan to Isle Royale in the summers of 1904 and 1905. Two specimens taken August 20 and September 1, 1904 were identified by Robert Ridgway of the U. S. National Museum. Mr. Peet, who was a member of the 1905 expedition says: "Rather rare throughout the island. Probably nearly all are resident throughout the year, although none were seen after September 12. July 12 one was procured in the balsam forest and on July 13 one was taken in the birches along Benson Brook" (Max M. Peet, Adams' Rep., Mich. Geol. Surv., 1908, p. 354).

There is no reason to suppose that this race differs materially in its habits from the common Hairy Woodpecker of more southern latitudes.

TECHNICAL DESCRIPTION.

Precisely like the ordinary Hairy Woodpecker except in size, and possibly a somewhat larger amount of white on the upper parts in the present sub-species. The measurements are as follows: Length 10 to 11 inches; wing 5.02 to 5.40; tail 3.60 to 3.80; culmen 1.40 to 1.62.

166. Downy Woodpecker. Dryobates pubescens medianus (*Swains.*). (394c)

Synonyms: Little Guinea Woodpecker, Little Sapsucker (error).—Picus (Dendrocopus) medianus, Swains, 1831.—Picus pubescens, Linn. (part), and most American authors.—Picus medianus, Nutt., 1834.—Dryobates pubescens, Cab., 1863, A. O. U. Check-list, 1889-1895.

Figure 89.

In general appearance precisely like the Hairy Woodpecker, but decidedly smaller, the wing usually less than four inches long and the total length from 6¼ to 7 inches (See note under Hairy Woodpecker).

Distribution.—Middle and northern parts of eastern United States and northward.

Probably the Downy Woodpecker, though actually not so abundant as some other members of the family, is better known than any other woodpecker of the state. He is a familiar resident not only of the deep forests and smaller patches of outlying woodland, but of nearly every orchard and grove, even coming regularly into the parks and shaded streets of our towns and villages and frequently nesting in such places, particularly if the English Sparrow is not superabundant. He shows a slight tendency to withdraw to quieter regions during the nesting period, and is doubtless more conspicuous in winter when the trees are leafless, but nevertheless is in evidence at all times of the year.

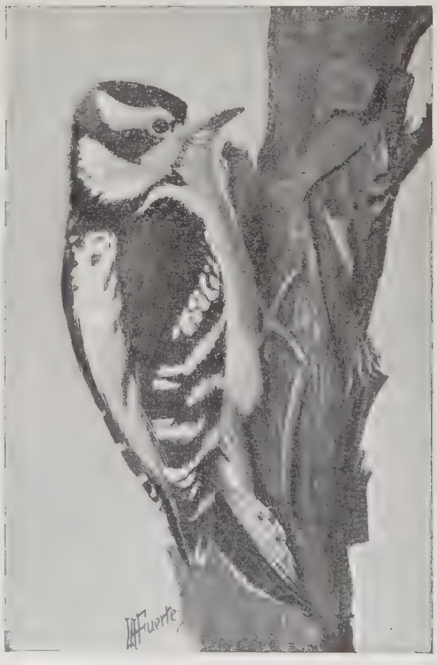

Fig. 89. Downy Woodpecker.
From Coues' Key to North American Birds, 5th ed., 1903. Dana Estes & Co.

He is one of our most confiding birds, and when busily at work cutting out grubs from fruit trees, or pecking into a dead stub for burrowing larvæ, will allow a quiet observer to approach within a yard or two and watch every movement. Although he gets a large part of his food from dead and more or less decayed wood he also searches the bark, limbs, and even the twigs of apparently healthy trees in search of eggs, larvæ, pupæ and adult insects of almost every kind, and we have no more indefatigable insect eater, and probably few birds more beneficial to the farmer and fruit grower.

According to Beal, who examined 140 stomachs at the Department of Agriculture in Washington, 74 percent of the food consisted of animal matter and 25 percent of vegetable. The animal matter consisted almost entirely of insects, of which ants formed about one-third (23 percent), beetles another third (24 percent) and the remainder was made up largely of caterpillars, with numerous bugs, among which were considerable quantities of plant lice. The vegetable food, forming 25 percent of the stomach contents, consisted almost entirely of wild berries and seeds, with a small amount of unidentifiable vegetable matter classed as rubbish.

The fruits taken were those of uncultivated plants and their consumption caused no loss whatever to the fruit grower. The only item weighing in any manner against the good character of the bird was the presence of seeds of the poison ivy and poison sumac which were found in the stomachs of 21 birds and sometimes in large numbers. These berries are eaten for the nutritious, waxy pulp which surrounds the seed, and the seeds themselves, which are usually ejected by the mouth, are found to germinate just as well afterwards. It is evident that these noxious plants owe their wide distribution in large part to the birds which feed upon the berries, and evidently the Downy Woodpecker does his part of this work.

In its consumption of insects the bird is decidedly useful, since it not only eats many of the common pests of the orchard, but it visits plantations of young trees, shrubs and even vines and hunts out injurious insects which might otherwise gain a foothold and cause serious trouble. During the winter it searches persistently for the hidden pupæ and cocoons of various insects and has been seen to drill through the silken cocoons of the cecropia moth and devour the pupæ within. It is credited also with the destruction of the larvæ of the codling-moth which often spend the winter hidden beneath a thin scale of bark or a dry leaf cemented to the tree, and Dr. Trimble's account of his discovery of this fact, in Morris county, N. J., is worth repeating here. He writes "I was gratified in being able to ascertain how he finds where to peck through the scales so as to be sure to hit the appleworm that is so snugly concealed beneath. * * * But what does he do? By sounding, tap, tap, tap, just as the physician learns the condition of the lungs of his patient by what he calls percussion. The bird uses his beak generally three times in quick succession—sometimes oftener; then tries another." One stomach was found to contain a codling-moth larva and some beetles; another held one beetle, the heads of two codling-moth larvæ and three small borers (Treatise on the Insect Enemies of Fruit and Fruit Trees, pp. 116-117).

In its general habits the Downy Woodpecker quite closely resembles its larger relative the Hairy Woodpecker, but, as already seen, it is more likely to frequent the open country, and especially the orchards and trees about houses. In nesting it also selects smaller trees or limbs, and the nest is more often placed low down, often only two or three feet above the ground. The eggs are commonly four or five, occasionally only three or as many as six. They are pure white, unspotted, and average .77 by .58 inches. The period of incubation is about twelve days. It begins nesting several weeks later than the Hairy Woodpecker and eggs are not likely to be found before the middle of May in southern Michigan, although in one instance we found a nest of young in Ingham county May 8 (1897). On the other hand, fresh eggs are frequently found the last week in May and occasionally even in June. It seems probable that only one brood is reared in the season, but birds which lose the first set of eggs are very likely to lay again. The hole for the eggs is excavated by the birds themselves, and although the same hole may be used year after year, probably in most cases a new hole is made for each new set of eggs. Frequently single birds are found excavating holes in midwinter, and they resort regularly to these holes to roost throughout the year.

Of the voice of this bird E. P. Bicknell says: "In addition to its usual short sharp note the Downy Woodpecker has a rattling cry which starts and ends with an abrupt precision suggestive of a mechanical contrivance set off with a spring. This is used in lieu of song. It is set off for the first time in the new year in March, usually about the middle, but sometimes earlier and again not until the end of the month or even early April. It is in use through the summer and autumn, often becoming infrequent in October, and in November still more so; although in some years not ceasing altogether until the end of the month. On a few occasions I have heard it in winter" (Auk, II, 257-258).

TECHNICAL DESCRIPTION.

Precisely like the common Hairy Woodpecker except for much smaller size and the additional fact that in the present species the outer pair of tail-feathers is always more or less barred with black, while in the Hairy these feathers are unspotted. The measurements are: Length 6.25 to 7 inches; wing 3.40 to 4.05; tail 2.29 to 2.90; culmen .68 to .82.

167. Black-backed Three-toed Woodpecker. Picoides arcticus (*Swains.*). (400)

Synonyms: Arctic Three-toed Woodpecker.—Picus (Apternus) arcticus, Swains., 1831.—Picoides arcticus, Gray, 1845, and most recent authors.

Plate XXXIII.

Reference to the accompanying plate will serve to identify this bird; it can be known readily by its entirely black upper parts, except that the male has a square golden-yellow patch on the crown, the female lacking this mark.

Distribution. Northern North America from the Arctic regions south to the northern United States (New England, New York, Michigan, Minnesota and Idaho), and in the Sierra Nevada to Lake Tahoe.

The Black-backed Three-toed Woodpecker has been confounded frequently with its near relative the so-called American Black-backed Woodpecker, better called the "Ladder-backed Woodpecker." The name appearing in the A. O. U. Check-list for the present species is Arctic Three-toed Woodpecker, but this name is objectionable since, of the two Three-toed Woodpeckers this is the more southern in its distribution. It seems better therefore, to call this bird (*arcticus*), the Black-backed Three-toed Woodpecker, and the other form (which does not occur in Michigan as far as we know) the Ladder-backed Three-toed Woodpecker.*

The Black-back is a fairly common species throughout the Upper Peninsula and the heavily wooded higher parts of the Lower Peninsula, but so far as we know it does not occur south of latitude 43° even in winter. The southernmost record so far as we know is that of three specimens taken, presumably at different times, near Port Huron, St. Clair county, by Mr. John Hazelwood. Mr. N. A. Eddy took a male February 7, 1885, on the Pine River, near Standish, Arenac county, and it is not uncommon, according to Wood and Frothingham, in Ogemaw, Roscommon and Oscoda counties, and has been recorded from nearly all the counties of the Lower Peninsula north of this, as well as from most of the Upper Peninsula, including Isle Royale. It is restricted mainly to heavily wooded regions, but opinions differ widely as to the character of timber preferred. One observer states that it frequents high lands and hardwood timber, another

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* For additional note on this species see Appendix.

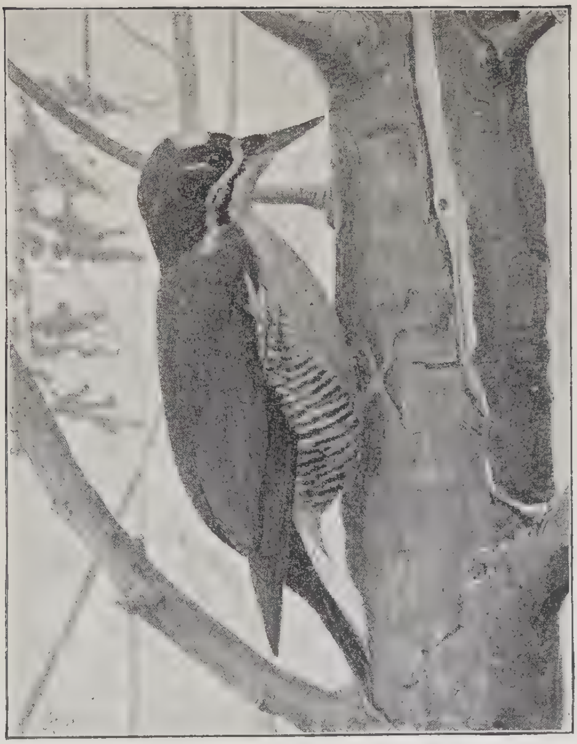

Plate XXXIII. Black-backed Three-toed Woodpecker.
From North American Fauna, No. 16.
Biological Survey, U. S. Department of Agriculture.

that it is seldom seen outside the pine districts, and still another thinks it should be looked for only in tamarack swamps. The truth probably is that the bird is nowhere abundant and its choice of a residence and feeding ground depends mainly upon the food supply. In one district therefore, it may be found in one sort of timber, and in another in a different kind.

Its habits are by no means thoroughly known and much is yet to be learned concerning them. Though usually considered resident wherever found, it seems certain that it wanders farther south in winter and it would not be surprising if stragglers were occasionally taken in the southern part of the state, especially on the western side where the pine forests formerly extended almost or quite to the Indiana line.

According to Bendire, "Both sexes assist in nidification, which is usually at its height between May 20th and June 10th, as well as in incubation, which lasts about two weeks. Only one brood is reared in a season. The eggs are generally four, mostly ovate, the shell fine-grained and only moderately glossy, and pure white." The eggs average .95 by .71 inches. Although we are not able to give an instance of its nesting within the state, there can be no doubt whatever that it breeds both in the Upper Peninsula and in a large section of the northern half of the Lower Peninsula.

Bendire states that its food seems to consist almost entirely of tree-boring insects and their larvæ, mainly Buprestidæ and Cerambycidæ, and this seems to be borne out by Beal's examination of stomachs at the Department of Agriculture. Audubon, however, states that it feeds also on berries and fruits. Under any circumstances it cannot be considered harmful to the agriculturist, and as its insect food is obtained almost entirely from dead and decayed wood it certainly does no harm to the forester; whether on the other hand it confers any marked benefit is questionable. As a rule the insects which infest dead trees are not those which have caused their death, and therefore, their multiplication, which may be checked by woodpeckers, would not be likely to cause further harm to the forests.

TECHNICAL DESCRIPTION.

Toes two in front and one behind.

Adult male: Crown with a conspicuous squarish patch of satiny golden yellow; nasal tufts black; forehead and stripe below eye white, bounded below by a narrow black stripe starting from base of lower mandible; rest of upper parts glossy black, the wing feathers alone with paired checks of pure white; under parts plain white, the sides and flanks barred with black; middle tail-feathers entirely black, the outer ones white and without bars.

Adult female: Precisely like the male except that it lacks the yellow crown patch.

Length 9.50 to 10 inches; wing 4.85 to 5.25; tail 3.60; culmen 1.40 to 1.60.

168. Sapsucker. Sphyrapicus varius varius. (*Linn.*). (402)

Synonyms: Yellow-bellied Sapsucker, Yellow-bellied Woodpecker, Red-throated Sapsucker.—Picus varius, Linn., 1766, and the older authors generally.—Sphyrapicus varius, Baird, 1858, and most recent authors.

Plates XXXIV, XXXV.

The adult is known by the scarlet on the forehead and front part of crown, together with the pale yellow of the lower breast and belly. In addition, the adult male has a bright red chin and upper throat. Both sexes have a velvet black chest band, but the throat and chin of the female are white.

Distribution.—Eastern North America north to about latitude 63½°, breeding from Massachusetts northward; south in winter to the West Indies, Mexico and Costa Rica.

The Sapsucker is an abundant migrant in most parts of the state and doubtless breeds regularly everywhere in the state except perhaps in the southernmost three tiers of counties; even there it may nest occasionally (one record for Monroe county). Farther northward it is a regular summer resident becoming more numerous over the upper part of the Lower Peninsula and throughout the Upper Peninsula. It seems to prefer hardwood growths and deciduous trees, although it is by no means absent from pine regions. Ordinarily it appears from the south during the first half of April, from the 1st to the 5th in the southern part of the state, and from the 12th to the 20th farther north. It moves southward somewhat irregularly but seems to be most abundant during the latter half of August. Occasionally a few individuals spend the winter with us.

It is by no means a noisy bird, and as its tattoo closely resembles that of other species, it may easily pass unnoticed unless attention is especially called to it. It is our single woodpecker which is always mischievous, and probably is the one least deserving of protection at the hands of the fruit grower, farmer and forester. Its well known habit of perforating the bark of fruit and shade trees with innumerable squarish holes, from which it first extracts the soft inner bark or cambium and later drinks the flowing sap, has given it the name of Sapsucker, to which it is fully entitled. Many ingenious theories have been advanced to account for this remarkable habit, but the simple truth of the matter is that the holes are made solely to get the inner bark and the sap, never for the purpose of extracting insects from the tree. True, the bird eats freely the insects which are subsequently attracted by the flowing sap, but this is no part of the original plan. The trees thus attacked are of various kinds, and probably at one time and another almost every species of forest and orchard tree is attacked, but the bird shows a particular fondness for the Scotch and Norway (red) pines, the sugar maple, apple, pear, mountain ash, haw and white birch.

The late Frank Bolles gives the following summary of the habits of the Sapsucker as observed by him in New Hampshire, from April to October, in 1889 and 1890: "From these observations I draw the following conclusions: The Yellow-bellied Woodpecker is in the habit for successive years of drilling the canoe birch, red maple, red oak, white ash, and probably other trees for the purpose of taking from them the elaborated sap and in some cases parts of the cambium layer; that the birds consume the sap in large quantities for its own sake and not for insect matter which such sap may chance occasionally to contain; that the sap attracts many insects of various species, a few of which form a considerable part of the food of this bird, but whose capture does not occupy its time to anything like the extent to which sap drinking occupies it; that different families of these Woodpeckers occupy different orchards, such families consisting of a male, female and from one to four or five young birds; that the orchards consist of several trees usually only a few rods apart, and that these trees are regularly and constantly visited from sunrise until long after sunset, not only by the woodpeckers themselves, but by numerous parasitical hummingbirds, which are sometimes unmolested but probably quite as often repelled; that the forest trees attacked by them generally die, possibly in the second

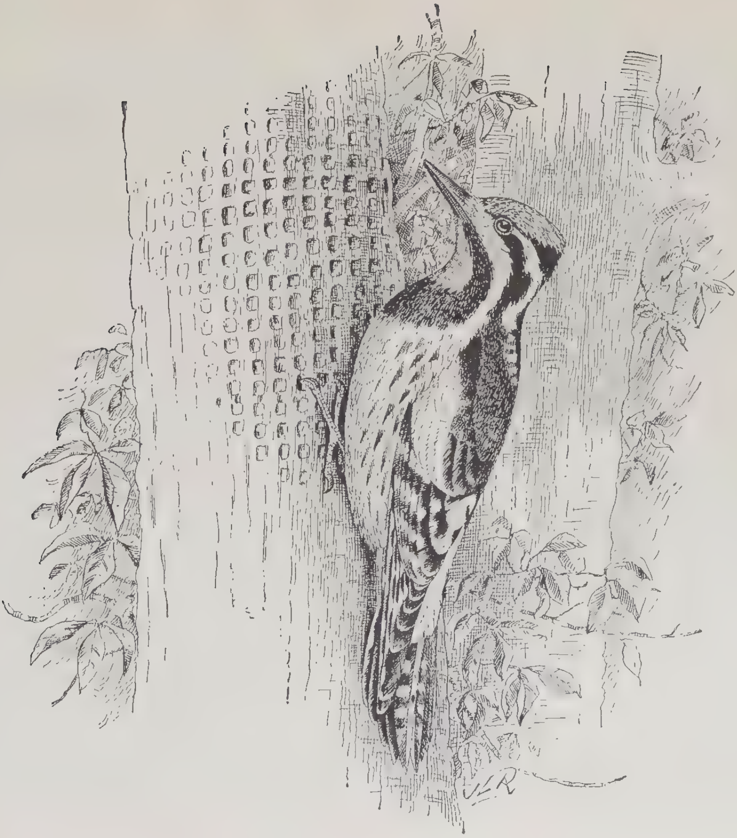

Plate XXXIV. Sapsucker.

From Farmers Bulletin No. 7. Biological Survey, U. S. Department of Agriculture.

Plate XXXV. Sapsucker. Photographed from life.
From Bird Lore. Courtesy of Dr. T. S. Roberts.

or third year of use; that the total damage done by them is too insignificant to justify their persecution in well wooded regions" (Auk, II, 1885, 270).

Aside from the sap and bark eaten the bird has a varied diet. Eighty-one stomachs examined and reported on by Professor Beal, of the U. S. Department of Agriculture, show that the food consisted of animal and vegetable matter in exactly equal amounts. Forty-eight per cent of the food consisted of insects, of which 36 percent was ants, 5 percent beetles, 2 percent caterpillars, 3 percent flies, 1 percent grasshoppers, and 1 percent plant-lice. The remaining 2 percent of animal matter was made up of spiders and myriapods. The insect food thus consumed is, however, of slight economic importance, from the fact that the ants are themselves of uncertain value and the other forms because they are taken in such small amounts. Undoubtedly some little good is done by the consumption of caterpillars and plant lice, but the amount must be very slight. On the other hand, about one-half of the vegetable food (23 percent of the whole food) consisted of the inner bark of various trees, while most of the remainder of the vegetable food was fruit. The fruits taken, however, with the possible exception of some of the blackberries and raspberries, were all wild fruits, and their consumption caused no loss to the fruit grower, It is worthy of mention that only one stomach among the 81 examined contained any seeds of the poisonous sumac, which is exceptional among the woodpeckers, these birds as a rule being industrious planters of these baleful seeds.

Probably this species of woodpecker, oftener than any other, excavates its nesting hole in the trunk or branch of a sound and living tree. This is by no means its universal custom, since nests are often found in dead wood, but it frequently uses the living tree. It begins to nest about the first of May, and digs a hole from eight to eighteen inches deep, the entrance being perfectly circular and about one and one-half inches in diameter. The eggs are from five to seven, and are laid, like those of most woodpeckers, on the chips at the bottom of the hole, without any nesting material. They are pure white, glossy, without spots, and average .86 by .66 inches.

A nest taken by Jerome Trombley, of Petersburg, Monroe county, Mich., was twenty-five feet up in a small basswood stub, near the edge of the woods. It was ten inches in depth and contained five fresh eggs on May 25, 1880. Another nest, of four fresh eggs, was found at Goodrich, Genesee county May 19, 1887, and on Grand Island, Lake Superior, Mr. E. A. Doolittle found several nests containing young the last week in June, 1906. According to Mr. Dunham it is a common summer resident in Kalkaska county, and breeds. On the other hand, Mr. Newell A. Eddy, of Bay City, states that from records extending over twenty years he finds nothing that would indicate that it breeds in that locality.

In regard to its notes Mr. Bicknell states: "Perhaps at the time it passes, April [Hudson Valley], it is not ready to begin courtship, and drumming, which, as with other woodpeckers, in a measure takes the place of song, is deferred until the birds are ready to seek their mates. I have never known this woodpecker to drum in autumn. At that season it seems especially reserved." In the vicinity of the Agricultural College the Sapsucker drums freely in April and May, after which time it seems to disappear and we have never found it nesting here. At Locke, however, in the same county, Dr. Atkins found it a common summer resident and nesting; it has also been reported in summer from the southeastern part of this county.

In a recent bulletin entitled Woodpeckers in Relation to Trees and Wood Products (Bull. 39, Biological Survey, U. S. Dept. Agriculture, 1911), W. L. McAtee devotes much space to the Sapsucker, and shows pretty conclusively that this bird, on the whole, does far more harm than good. Not only does it kill valuable trees outright but its attacks cause distortion of the trees themselves and irregularities in the woody layers, while the punctures made for cambium and sap let in water, fungus germs, bacteria, etc., which often result in serious damage to the timber.

TECHNICAL DESCRIPTION.

Adult male: Forehead, crown, chin and throat bright crimson, side of head with two white stripes and three black ones, the lowermost black one bordering the red throat and running into the conspicuous velvet black patch on the upper breast; rest of under parts pale yellow or yellowish white, the sides and flanks spotted, streaked or barred with blackish; upper parts mixed black and white, the rump and upper tail-coverts nearly white; wings spotted with black and white and a conspicuous broad white stripe on the greater coverts, forming a good field-mark; two middle tail-feathers mostly white on inner webs; outer tail-feathers with only narrow white edgings or small spots near tips; bill bluish black; nasal tufts white; iris brown.

Adult female: Similar to male, but the red of chin and throat replaced by pure white, and the red of crown often mixed with gray or brown. Young birds of either sex usually lack all red, or have only a few scattered red feathers on the crown, while the under parts are more streaked and mottled, the black chest patch sometimes quite indistinct; the species may always be recognized, however, by the white wing-patch and white-marked middle tail-feathers, aside from the yellowish belly.

An interesting abnormality is noted occasionally in birds which seem otherwise adult. It consists in the replacement of the red crown by glossy black, so that the entire top of the head is clear black, with perhaps a few minute flecks of white or a tinge of red on the forehead. The writer has seen four or five such specimens, all females, and P. A. Taverner, of Detroit, has taken one or two.

Length 7.75 to 8.75 inches; wing 4.80 to 5; tail 2.90 to 3.20; culmen 1 to 1.08.

169. Log-cock. Phlœotomus pileatus abieticola (*Bangs*). (405a)

Synonyms: Pileated Woodpecker, Northern Pileated Woodpecker, Great Black Woodpecker, Cock of the Woods, Wood Cock, Wood Hen.—Ceophlœus pileatus abieticola, Bangs, 1898.—Picus pileatus, Linn., 1766, Wils., 1811, Aud., 1834.—Dryocopus pileatus, Bonap., 1838.—Hylotomus pileatus, Baird, 1858, and many subsequent authors.—Ceophlœus pileatus, Cab., 1862, A. O. U. Check-list, 1889, 1895.

Plate XXXVI.

Known at once by its large size (scarcely less than the Crow) and prevailing brownish black plumage with conspicuous red cap. The largest by far of our woodpeckers.

Distribution.—Forests of the northern United States and northward to about 63°. Toward the south it intergrades with *Ceophlœus pileatus pileatus*, but as yet the limits of the two species have not been definitely mapped. Resident and nesting (?) wherever found.

This, the largest of our woodpeckers, was formerly an abundant bird throughout the state, but with the deforesting of the country it has become more and more rare until at the present time it is seldom seen in the southern half of the Lower Peninsula and probably is nowhere as abundant as it was twenty years ago. Nevertheless, it is far from rare in the wilder parts of the Lower Peninsula, and is fairly common in many districts in the Upper Peninsula.

Among the lumbermen of the north it is commonly known as the "Wood

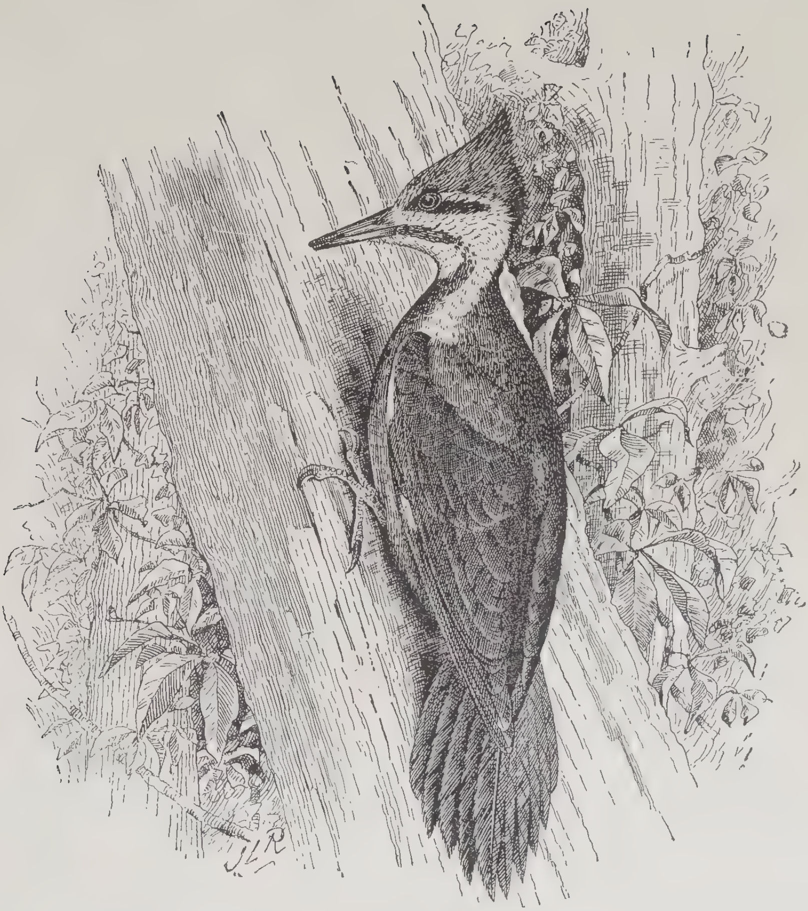

Plate XXXVI. Log-cock.

From Farmers Bulletin No. 7. Biological Survey, U. S. Department Agriculture.

Cock," a misnomer easily accounted for, since it is widely known as "Log-cock" and of course recognized as a woodpecker. Bendire states that it is also known in various parts of the country as "Black-log," "Black Wood-cock," "Johnny-cock," "Wood Hen," and "Wood Chuck." He states also that Mr. B. F. Gault says that in southeastern Missouri it is known by the peculiar name of "Good Guard." The origin of this was at first incomprehensible to us, but one of our students informs us that near his home in South Carolina the bird is universally known among the negroes as "Lord God," which is obviously a corruption of "Log-cock."

According to Bendire "the ordinary call-note is a loud 'cock-cock-cock' several times repeated; another resembles the 'chuck-up' of the Red-shafted Flicker, only somewhat slower, louder, and clearer; others again remind me of the clacking of a domestic hen."

In Michigan the Log-cock appears to be resident wherever found, although like most other woodpeckers it wanders widely in search of food. This is obtained largely, if not entirely, from dead trees, and it seems not to be at all material whether these are standing or fallen. With its powerful beak it tears off the bark and cuts out great wedges of decaying wood, thus exposing the grubs of the various beetles which are found in such situations. It also feeds largely upon ants, which are likely to be found in the same places, but it also resorts to the ground for these and other insects. Mr. Manly Hardy, of Brewer, Me., states that he has seen one pick a large hole "through two inches of frozen green hemlock to get at the hollow interior, and it seemed impossible that a steel tool of the same size could have done such work without being broken."

Most observers state that this bird is very shy, but this is contradicted by others. Our own experience with the species is limited, but we once spent an hour in following a Log-cock which allowed us to stand within twenty feet and watch him at work for many minutes at a time.

We have few records of its nest in Michigan. A set of four fresh eggs was taken from a hole two feet deep in a cherry stump, in a swamp in Almena township, Van Buren county, April 26, 1889, by Mr. F. H. Chapin, who took the female as she left the nest. Mr. Samuel Spicer of Goodrich, Genesee County, took two sets of eggs there in successive years from the same pair of birds, one set containing three eggs, the other four. Both nests were located in dead poplar stubs. Probably the years were 1886 and 1887, but Mr. Spicer is not sure. From the fact that in Warren county, New York, a nest was found with four eggs on May 15, 1878, and that C. H. Morrell found four young just breaking through the shells May 28, 1895, and three fresh eggs May 15, 1896, both at Pittsfield, Maine, it seems probable that on the average May would be the most likely month for egg-laying in Michigan. The eggs are pure white, unspotted, very fine grained, and as glossy as if enameled. They average, according to Ridgway, 1.27 by .96 inches, but this includes northern and southern birds, and since our northern form is decidedly larger than the southern, Michigan eggs should exceed this. A single egg in our College collection, marked "Lansing," and collected by Wm. K. Kedzie, measures 1.40 by 1.00 inch. Probably but one brood is reared in the season. According to A. W. Butler the period of incubation is about eighteen days.

It is unnecessary to give the records of all the specimens recently taken in the state, but the following may be mentioned: One taken at Bangor, Van Buren county, in the autumn of 1897, by Frank H. Shuver; seen in Emmet, Cheboygan and Charlevoix counties in August and September, and in Emmet, Mackinac, Alger and Luce counties in winter (F. H. Chapin);

reported from Oscoda county, July 5, and Alcona county, September 19, 1904 (Wood & Frothingham); one seen at Ann Arbor March 1, 1899 (Chas. L. Cass); common in winter on Mackinac Island in 1889-91 (S. E. White); common and breeds on Neebish Island, St. Mary's River (Major Boies); frequent in Lake county in November, 1896 and 1900 (F. H. Chapin); not uncommon in Kalkaska county in 1907 (W. H. Dunham); specimens in the College Museum from Missaukee county, December, 1895; two taken near Greenville, Montcalm county, in 1896 by the late Percy Selous; not uncommon at Chatham, Alger county, in July, 1903 (Barrows); four seen near Houghton, Houghton county, in November 1904 (Wilbur H. Grant); two taken near Okemos, Ingham county in 1905 (Barrows); not uncommon on Isle Royale, Lake Superior, in 1905 (Max M. Peet); fairly common in parts of Iron county in 1908 (Blackwelder).

TECHNICAL DESCRIPTION.

Adult male: Entire top of head (including the conspicuous crest) and patch at base of lower mandible on each side, bright scarlet; side of head with a black stripe between two white ones, the lower of which runs down the side of neck for several inches; rest of plumage, above and below, entirely slaty or brownish black, except the lining of the wings, and the basal half of the inner webs of all the wing-feathers, which are pure white; sometimes the primaries also are white-tipped; tail entirely black; upper mandible blackish, lower mandible largely whitish; iris brown.

Adult female: Similar to male, but only the occipital crest red, the forehead, crown, and malar region being brownish gray or light slate color; the general color of the plumage, moreover, is lighter and more slaty than in the male. Not much difference in the size of the sexes.

Length 16 to 19 inches; wing 9 to 10; tail 6.75 to 7.40; culmen 2.10 to 2.65; spread of wings 25 to 29 inches.

170. Red-headed Woodpecker. Melanerpes erythrocephalus (*Linn.*). (406)

Synonyms: Red-head, Tricolor.—Picus erythrocephalus, Linn., 1758.—Melanerpes erythrocephalus, Swains., 1831, and authors generally.

Figure 90.

Our only woodpecker with entirely red head and neck. Otherwise conspicuous by the velvet black back, wings and tail, with large areas of white on wings and rump.

Distribution.—United States, west to the Rocky Mountains, and north from Florida to about latitude 50°, straggling westward to Salt Lake Valley and Arizona; rare or local east of the Hudson River.

This is one of our best known woodpeckers, abundant in most places and apparently not entirely absent from any section of the state. It frequents equally the small groves of timber in cultivated districts and the slashings and edges of heavy timber in the wilder parts of the state. It is the woodpecker oftenest seen in driving along country roads, where it flies from fencepost to telephone pole and by its noisy cries and striking plumage attracts the attention of the most unobservant.

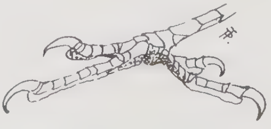

Fig. 90.
Foot of Red-headed Woodpecker. (Original.)

The great majority of individuals move southward at the approach of cold weather, returning again in numbers in the latter part of April or early in May. A few, however, linger with us all winter, at least in the southern half of the state, feeding largely on beech nuts, but hunting insect larvæ in decayed wood in the same manner as other woodpeckers.

The food in summer is very varied and is about equally divided between animal and vegetable substances. One hundred and one stomachs examined at the Department of Agriculture, and reported on by Professor Beal, give the following results: Animal food 50 percent, vegetable food 47 percent, sand and gravel 3 percent. All but 1 percent of the animal food consisted of insects, the remaining 1 percent being made up of spiders and myriapods. The insect food included the following items: Ants 11 percent, beetles 31 percent, grasshoppers 5 per cent, caterpillars 1 percent, plant lice 1 percent. Unfortunately a very large part of the beetles eaten (24 percent) consisted of the predaceous families Carabidæ and Cicindelidæ (the ground beetles and tiger beetles), which are mainly beneficial. The ants are of doubtful utility, so that practically the main good done in the consumption of insects lies in the caterpillars, grasshoppers and plant lice eaten, which aggregate only 7 percent of the food. To quote Prof. Beal "A preference for large beetles is one of the pronounced characteristics of this woodpecker. Weevils were found in 15 stomachs, and in several cases as many as ten were present. Remains of Carabid beetles were found in 44 stomachs to an average of 24 percent of the contents of those that contained them, or ten percent of all. The fact that 43 percent of all the birds taken had eaten these beetles, some of them to the extent of 16 individuals, shows a decided fondness for these insects, and taken with the fact that 5 stomachs contained Cicindelids or tiger beetles forms a rather strong indictment against the bird." In Tazewell county, Ill., Professor Forbes found it eating cankerworms freely in orchards overrun with them.

The 47 per cent of vegetable food covered 33 percent of fruit, much of it cultivated, and a considerable amount of corn, much of it in the milk. Among the cultivated fruits eaten freely were apples, pears, cherries, blackberries, raspberries and strawberries, besides many wild fruits. The Red-head is also known to eat both cultivated and wild grapes in quantity. During autumn and winter it eats large numbers of acorns and beech nuts and sometimes stores these away in large quantities in hollow trees, fence-posts and similar cavities.

Practically the only favorable statement that can be made in regard to the vegetable food of this bird is the fact that it does not seem to eat the berries of poison sumac or poison ivy, and so is not one of the birds responsible for the distribution of these noxious plants.

One disagreeable trait which has been observed several times is its habit of eating the eggs and even the young of other birds, and this not always for the sake of getting them out of coveted nesting places, but apparently from hunger, or from mere mischief. Dr. R. H. Wolcott writes that he has seen this bird destroy the eggs of the Wood Thrush and suspected it of other depredations. Bendire gives several instances of what he calls its "canabalistic tendency."

Captain Bendire describes its notes as follows: "Its ordinary call-note is a loud *tchur-tchur*; when chasing each other a shrill note like *charr-charr* is frequently uttered, an alarm is expressed by a harsh rattling note as well as by one, which, according to Mr. Otto Widmann, is indistinguishable from the note of the tree frog. He tells me that both bird and frog sometimes answer each other. * * * From an economic view it appears to me certainly to do fully as much if not more harm than good, and I consider it less worthy of protection than any of our woodpeckers, the Yellow-breasted Sapsucker not excepted."

In Kalamazoo county the late Richard B. Westnedge took nests of fresh eggs from May 21 to May 28, and often farther north eggs are not laid before the first week in June. The nest is a hole in the dead trunk or branch of a tree, the entrance being about 1¾ inches in diameter and the depth of the hole varying from eight inches to two feet. Usually the nests are at a considerable height from the ground, rarely less than ten feet and often sixty feet or more. Not infrequently telephone poles are used for nesting, but we have never seen a nest in a fencepost. But one brood is reared in the season, but, as with other species, a second laying is made if the first set of eggs be taken (July 11, 1877, Kalamazoo county). The eggs vary from four to seven, are white, unspotted and glossy, and average .97 by .75 inches.

TECHNICAL DESCRIPTION.

Adult male: Entire head and neck, all round, deep crimson; back, scapulars, and most of wings glossy black; terminal half of secondaries, rump and upper tail-coverts pure white; under parts, from lower neck to tail, pure white, sometimes washed with yellowish or orange on the belly; tail entirely black, or a few of the outer feathers white-tipped; bill blackish or horn-colored; iris brown.

Adult female: Similar to male, but usually with a narrow belt of clear black between the red throat and white breast, and the inner secondaries always more or less barred or spotted with black.

Young: Without any red, or only a few feathers, on head and neck, these parts brownish gray, thickly spotted or mottled with blackish, and breast and sides streaked with the same; rump and tail as in old birds; all the secondaries white, barred or spotted with black.

Length 9.25 to 9.75 inches; wing 5.30 to 5.70; tail 3.60 to 3.75; culmen .90 to 1.15.

171. Red-bellied Woodpecker. Centurus carolinus (*Linn.*). **(409)**

Synonyms: Zebra Bird, Zebra-back.—Picus carolinus, Linn., 1758, Wils., Aud. and others.—Centurus carolinensis, Swains., 1837, and most subsequent authors.

Figure 91.

Our only woodpecker which shows any red on the belly, but often this is a mere tinge, by no means conspicuous. On the other hand, the beautifully cross-barred black and white back and wings are very conspicuous and render the bird unmistakable.

Distribution.—Eastern and southern United States, north casually to Massachusetts, New York, Ontario, southern Michigan, and central Iowa; west to eastern Nebraska, eastern Kansas, Indian Territory and Texas.

The distribution of this bird in Michigan is of much interest. It seems to be nowhere abundant, but is more frequently met with in the southern half of the state, where, although not common, it cannot be considered particularly rare. It is reported as a regular migrant in almost every county in the southern part of the state, as far north at least as the Saginaw Valley, although it seems to be rather more abundant on the west side of the state than in the east.

B. H. Swales does not include it in his list of the birds of St. Clair county (MSS.), but Hazelwood finds it, though rarely, at Port Huron. P. A. Taverner says it is very rare about Detroit, has found it but once,

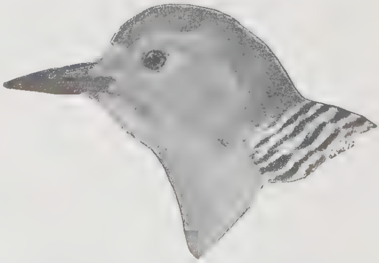

Fig. 91. Red-bellied Woodpecker. From Bailey's Handbook of Birds of the Western U. S. Houghton, Mifflin & Co.

in September. At Grand Rapids it is a common migrant, particularly in spring, while in many of the southern counties it is said to be more frequently seen in winter than at any other season. Dr. Atkins found it rather common at Locke, Ingham county twenty-five years ago, and states that at least three pairs nested there in 1884. Mr. F. H. Chapin noted it several times in Eden township, Lake county, north of 44°, in 1896, and Major Boies saw it several times on Neebish Island in the St. Mary's River, where he says it undoubtedly breeds. This is north of 46°, and the northernmost record for this species in the state. Major Boies' record has been questioned, but he is perfectly familiar with the species from long residence at Hudson, Lenawee county, where it is fairly common, and there is no reason whatever to doubt his identification. It is also certain that at most points in Michigan where the species occurs regularly it is distinctly a migrant, the greater number certainly moving northward in spring and returning southward in the fall. Since it is well known that this bird winters in southern Michigan frequently and without hardship there is no obvious reason why it should not spend the summer as far north as it pleases. It is not a very conspicuous bird and ordinarily is decidedly shy, seldom coming into orchards or parks, but preferring the heavier growths of the river bottoms, especially where beech and oak are the prevailing trees.

Undoubtedly it nests in Michigan wherever it occurs, but we have few notes of nests actually found. Dr. Gibbs states that on May 15, 1873 he found a nearly completed nest in Kalamazoo county, about six feet from the ground, in a stump, and saw both the birds at work. The late Richard B. Westnedge took a set of eight eggs from a dead elm stump in Kalamazoo county, May 25, 1892. This nest was thirty feet from the ground, and the hole was one and one-half feet deep. Samuel Spicer of Goodrich, Genesee county, says this bird is rather common in that vicinity and nests. He took one set of eggs from a hole in a sugar maple between 1881 and 1885, and found another nest in a basswood but did not take the eggs. J. B. Purdy, of Plymouth, Mich., took a set of five eggs, April 26, 1889, from a hole in the top of a tall beech deep in the forest. Jerome Trombley, of Petersburg, Monroe county, took a nest of four fresh eggs at that place, May 23, 1882. It was forty feet up in a basswood stub. The hole was about a foot in depth, two inches in diameter at the entrance, enlarging to four or five inches at the bottom. Miss Harriet H. Wright, of Saginaw writes as follows: "Last June (1907) I found a pair of Red-bellied Woodpeckers nesting here in an old oak tree at the edge of a piece of woods. Watched these birds until they were feeding young. I have never before found them nesting here, have seen them during migration only." The eggs are pure white, polished, unspotted, and average .96 by .71 inches.

The little that is known of the food of this species indicates that it is very similar to that of the Redhead. Twenty-two stomachs examined at the U. S. Department of Agriculture, and reported on by Professor Beal, showed that vegetable matter formed 74 percent of the food, and animal matter (all insects) the remaining 26 percent. Ants formed 11 percent, large beetles 10 percent, and the remainder consisted of various insects. The vegetable food is quite varied, but fruits are conspicuous and the bird seems to be particularly fond of seeds of the poison *Rhus*, since they were contained in six stomachs and formed twelve percent of the entire food of the 22 birds.

In Florida, at least in some sections, this bird is known as the "Orange Sapsucker" and "Orange Borer," owing to its fondness for oranges. It eats into these in much the same manner that the Redhead attacks apples at the north, but it rejects the skin and seeds, eating only the pulp. In Michigan the bird is too scarce to have any economic importance.

TECHNICAL DESCRIPTION.

Adult male: Entire top of head and back of neck, from bill to shoulders, bright scarlet; remainder of upper parts, including wings, closely and evenly barred with glossy black and pure white, the rump and upper tail-coverts not quite so thickly marked with black; sides of head, and entire under parts, ashy gray of varying depth, sometimes tinged with salmon on throat and breast, and the middle of the belly always strongly washed with scarlet, sometimes almost as bright as the crown; middle tail-feathers black at tip, largely white elsewhere; lateral tail-feathers barred with black and white; bill black; iris red.

Adult female: Similar to male, but the red of the head restricted to the nasal tufts, occiput and nape, most of the top of the head ashy gray, like the breast; the red of the belly is likely also to be fainter and less extensive, sometimes hardly more than a reddish tinge.

Young birds are similar as regards pattern of coloration to adults of the same sex, but are always much duller, the red of the head usually lacking altogether, the belly often merely washed with buffy, and the black and white markings less sharply defined.

Length 9 to 10.10 inches; wing 4.85 to 5.50; tail 3.50 to 3.95; culmen 1 to 1.20.

172. Flicker. Colaptes auratus luteus *Bangs.* (412)

Synonyms: Northern Flicker, High-hole, Heigh-ho, High-holder, Wake-up, Wick-up, Clape, Golden-winged Woodpecker, Yellow-shafted Flicker, Yellow-hammer, Pigeon Woodpecker, Wood-pigeon, etc.—Cuculus auratus, Linn., 1758.—Colaptes auratus, Swains., 1827, and most later writers.—Colaptes auratus luteus, Bangs, 1898.

Plate XXXVII.

The golden yellow of the lower surfaces of wings and tail, and the profuse circular black spots ("polka-dots") of breast, sides and belly, are peculiar to this species. The first mentioned character is a good field mark when the bird passes above the observer, and the conspicuous white rump is an even better mark as it flies away from him.

Distribution.—In summer northern and eastern North America from North Carolina northward to Canada. In winter southward probably beyond the limits of the United States, but records confused with those of the southern form. Breeds throughout its summer range.

This is an abundant summer resident of the entire state and in most sections is commonly referred to as the most abundant woodpecker. A few individuals remain all winter, particularly in the southern third of the state, but the great majority move southward in September and October and do not return until the following April.

This woodpecker differs widely in its habits from most others of the family, getting a large proportion of its food from the ground and a correspondingly small amount from the trees. In correlation with this habit its bill is more curved and less chisel-shaped than in other members of the family and it does not dig so readily into dead wood either soft or hard. Apparently it never digs into living trees.

Its food consists largely of insects, among which ants form by far the largest item. It is exceptional to examine a stomach which does not contain ants, and the average stomach contains hundreds, sometimes even thousands. These are mainly ground-inhabiting species and of little economic importance, so that the Flicker does no harm and possibly some good by eating them. Two hundred and thirty stomachs examined at the

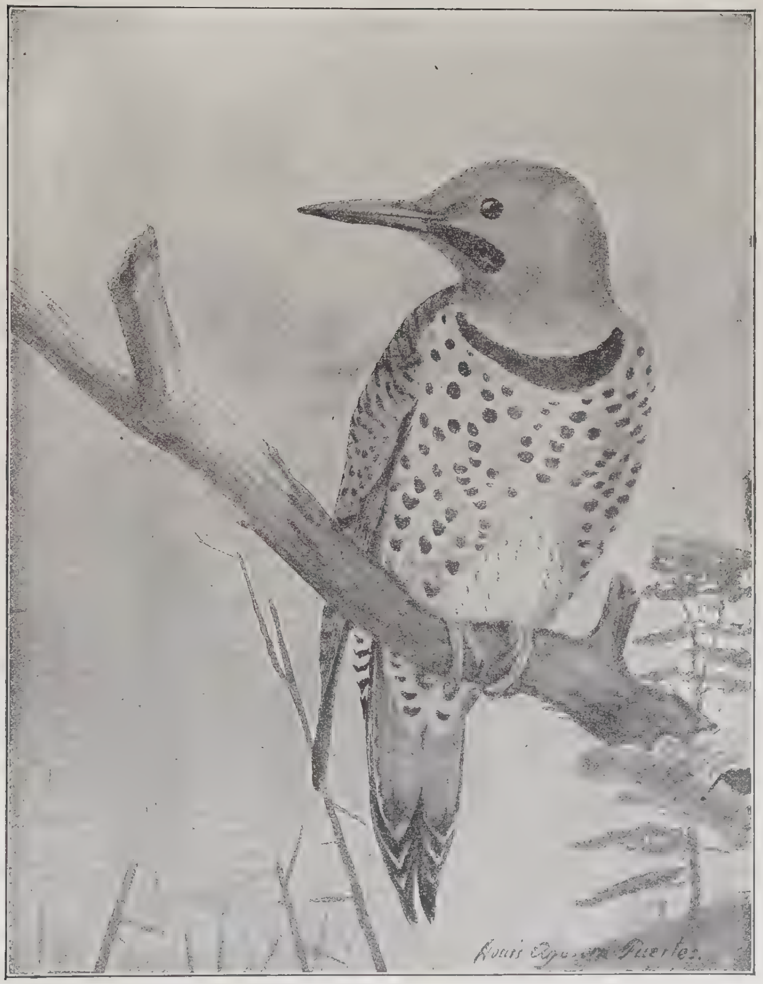
Louis Agassiz Fuertes.

Plate XXXVII. Flicker. Adult male.

Courtesy of National Committee of Audubon Societies.

U. S. Department of Agriculture, and reported on by Professor F. E. L. Beal, showed 56 percent of animal matter, 39 percent of vegetable matter and 5 percent of sand. More than three-fourths of the animal matter consisted of ants, so that they formed at least 45 percent of the entire food for the year. In two cases the number of ants in single stomachs exceeded 3,000. Other conspicuous insects found in the stomachs were large ground beetles, mainly carabids, and others presumably beneficial. On the whole the insect food of the Flicker does it little credit and its vegetable food does not help the record much. It eats corn in the milk, and at least twenty varieties of fruits, mostly wild. However, it eats cultivated cherries and grapes, as well as candleberries or wax-myrtle berries (*Myrica cerifera*) and berries of the poison ivy and poison sumac. On the whole its food shows it to be of little economic account one way or another.

It nests commonly in May, selecting the decayed trunk of a tree and excavating a hole from one to three feet in depth and usually at no great height from the ground, most often from ten to thirty feet. It lays from six to ten eggs, the usual number being seven or eight, but if all but one or two be removed the Flicker has been known to continue laying until fifty or more have been deposited. Apparently but one brood is reared in a season, but, as with other birds, a second laying is made if the first comes to grief.

It has a great variety of notes, some of which are indicated with more or less exactness by the common names listed above. Eugene Bicknell says: "Its long rolling call is usually given from some high perch, and has a free far-reaching quality that gives it the effect of a signal thrown out over the barren country as if to arouse sleeping nature. This call continues irregularly through the summer, but then loses much of its prominence amid the multitude of bird songs. It is not infrequent in September, but later than the middle of October I have not heard it. Another vocal acquirement of the High-hole is a sound much like that caused by the whetting of a scythe. It is hardly necessary to allude to the familiar call-cry of the species, which may well have conferred the name Clape which this bird bears in certain sections. In the breeding season the High-hole seems to be quieter than either before or after, perhaps from considerations of caution" (Auk, Vol. II, pp. 259-260). Captain Bendire gives the following description of some of its notes: "One of their commonest calls at this season of the year [spring] is a clear *whick-ah, whick-ah;* another sounds like *quit-u, quit-u*, a number of times repeated; *tchuck-up tchuck-up*, is another familiar sound uttered by them; a far-reaching *clape, clape*, is also frequently uttered, while a quickly given rolling or rattling *three-he-he-he-he* and a low *cack-cack-cack* seems to be notes of endearment. Another call, when courting its mate, sounds like *ouit-ouit* and ends with a soft *puir, puir*, or a cooing *yu-cah, yu-cah.* Low chuckling sounds are also frequently uttered during their love-making; another common call note sounds like *zee-ah, zee-ah* and during the summer a clear *pi-ack, pi-ack*, or *pioh*, is also frequently heard; in fact, no other of our woodpeckers utters such a variety of sounds."

TECHNICAL DESCRIPTION.

Adult male: Top of head clear bluish-gray; occiput with a bright scarlet crescent; back, scapulars and wing-coverts brown, sharply barred with clear black; rump white, unspotted; upper tail-coverts white, barred or marbled with black; sides of face above and below eye, and entire throat, pinkish buff (vinaceous), the throat and cheek separated by a velvet black malar patch; chest with a large jet-black crescent; breast, sides and belly, pale brownish gray, thickly marked with circular or heart-shaped jet-black spots or "polka-dots;" flanks and under tail-coverts whitish barred with black; under surface of wings and tail (except at tip) golden yellow, the shafts brightest; tail broadly black at tip, only the outer feathers tipped and spotted on outer webs with whitish; bill blackish; iris brown.

Adult female: Precisely like the male, except that it lacks the black malar stripe or "mustache," this region being of the same color as throat. The young are scarcely different from adults of the same sex, except that the colors are somewhat duller and the markings not so sharp. The black mustache of the male is well developed before the young leave the nest.

Length 12 to 12.75 inches; wing 6 to 6.60; tail 4.70 to 4.95; culmen 1.20 to 1.40.

Order XVI. MACROCHIRES. Goatsuckers, Swifts and Hummingbirds.

KEY TO FAMILIES.

A. Nail of middle toe pectinate (with a comb) on inner edge. Family 47. Caprimulgidæ. Whippoorwills and Nighthawks. Page

AA. Nail of middle toe not pectinate. B, BB.

B. Each tail-feather tipped with a sharp spine (Fig. 92). Family 48. Micropodidæ. Swifts. Page

BB. Tail-feathers not spine-tipped; birds of very small size, less than four inches long; plumage more or less metallic. Family 49. Trochilidæ. Hummingbirds. Page

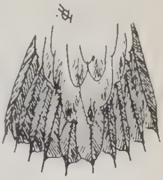

Fig. 92.

Family 47. CAPRIMULGIDÆ. Whippoorwills and Nighthawks.

KEY TO SPECIES.

A. A conspicuous white patch in the middle of the wing (on several primaries). Nighthawk. No. 174.

AA. No white patch on the wing. Whippoorwill. No. 173.

173. Whippoorwill. Antrostomus vociferus vociferus (*Wilson*). (417)

Synonyms: Caprimulgus vociferus, Wils.—Capr. virginianus, Vieill.

Plate XXXVIII.

The diminutive bill and immense mouth, taken in connection with the very small feet and the pectinate middle claw, are distinctive marks of the goatsuckers; in addition a conspicuous pure white patch in the wing marks the Nighthawk, and the absence of such a spot indicates the Whippoorwill.

Distribution.—Eastern United States to the Plains, and from latitude 50° southward to Guatemala.

In Michigan the Whippoorwill is universally distributed, and although nowhere abundant may be found in almost every section, except possibly in regions where the woodland has been entirely removed, or in the most populous districts immediately about the larger cities. In many places where it was formerly common it is now reported as seldom heard, but it is probable that it has not entirely disappeared from any of these sections. It is not a particularly wary bird and even seems to prefer the vicinity of dwellings, frequenting the open pastures and fields in farming districts and seeming to have a special preference for sandy roads bordered by low trees and bushes.

It is one of the later birds to arrive from the south, although it reaches southern Michigan almost always in April and even the northern part of the state by the middle of May. It moves southward by the first of October and the larger number probably pass entirely out of the United States to winter, a few only lingering in the Gulf States. It is one of the birds much oftener heard than seen, and its characteristic call resembles quite clearly the words, whip-poor-will, the middle syllable being slighted and the first and last syllables rather strongly accented. It has also numerous clucking and purring sounds, which however, are inaudible at a distance. According to Major Bendire it is much attached to its nesting sites and returns to the same spots year after year. He says "Its flight is strong, swift, graceful and entirely noiseless, gliding like a shadow across the ground in pursuit of insects," which are mainly moths and beetles.

It nests rather early, the eggs in southern Michigan being laid from May 10th to 20th and somewhat later farther north. No nest whatever is constructed, but the eggs are laid upon the dead leaves on the ground, usually without the slightest hollow being prepared; in fact frequently they are so placed that they will roll easily in any direction. The eggs are two, creamy or pure white, spotted or blotched with lilac and brown. They are regularly elliptical in outline, being of the same size at both ends, and averaging 1.12 by .84 inches. Many observers claim that if frequently disturbed the old bird will remove the eggs to another place, carrying them in the mouth. It seems to be true that the eggs frequently disappear soon after their discovery, but so far as we can learn no one has actually seen the bird remove them. Jerome Trombley of Petersburg states that "If you find a single egg of the Whippoorwill and do not take it it will be gone next day; the old bird carries it off in her mouth invariably. I have noticed the disappearance many times." On the other hand many observers have watched the eggs of the Whippoorwill, repeatedly disturbing the birds, and have failed to cause the removal of the eggs. Bendire states that after the young are hatched the mother is more likely to remove these than the eggs, but it seems unlikely that these are carried in the mouth, and Mr. H. W. Flint, of New Hampshire, Conn., once saw a female carry a young bird about a rod. He says he does not think she used her bill, but is almost sure the claws and legs were used "as the young was hugged close to the body." Like most other birds which nest on the ground the mother makes every effort to prevent the discovery of the nest, and when flushed often feigns lameness or other injury and attempts to decoy the intruder away.

On its arrival from the south the Whippoorwill begins to "sing" almost at once and continues until the young are well grown, but according to Bicknell the note is seldom heard after the middle of the year (last of June), although it is well known to sing in the autumn.

Its food, so far as known, consists entirely of insects, the larger part of which are taken on the wing, but the bird frequently alights on the ground to pick up food, although its feet are so weak that it does not run about much. Undoubtedly it does some good by its consumption of injurious insects, but in most places it is not abundant enough to be much of a factor in this work.

TECHNICAL DESCRIPTION.

Bill very small, but with long stiff bristles extending far beyond its tip; eyes very large; feet small and weak, the claw of the middle toe pectinate (with a comb) on its inner edge; tail rounded at end.

Adult male: Upper parts mottled with black, brown and silver gray, the top of head broadly streaked with black in the middle, more narrowly on the sides, where the gray is

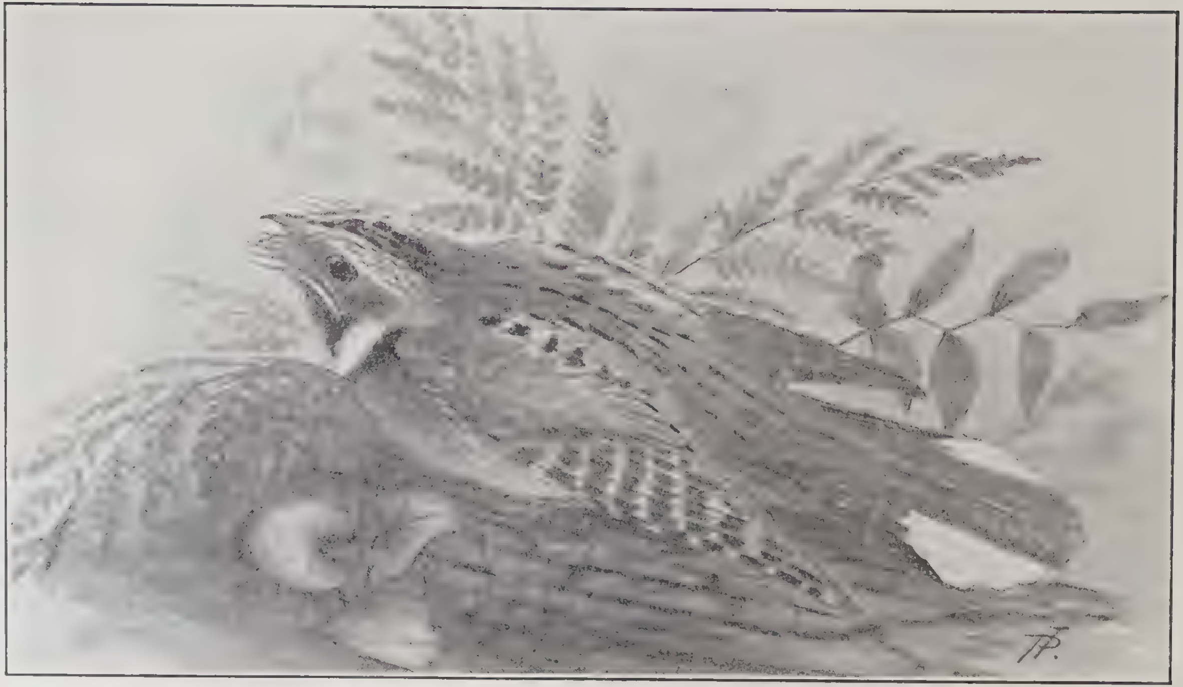

Plate XXXVIII. Whippoorwill. From an original drawing by P. A. Taverner.

more abundant; back, scapulars and wing-coverts similar, the degree of "frosting" quite variable, the black markings tending to become cross-shaped; primaries blackish, spotted and barred with rusty brown on both webs; chin and breast brownish black to sooty black, more or less freckled with buff, the throat with a pure white collar; sides and belly buffy white, finely and irregularly barred with black; middle tail-feathers like the back, the others blackish, spotted and imperfectly barred with rusty buff, the three outer pairs mostly pure or buffy white, on the terminal half.

Adult female: Similar to male, but the white collar often buffy tinted, and the white of the tail much more restricted, only the tips of the three outer pairs being whitish (usually buffy).

Length 9.50 to 10 inches; wing 5.80 to 6.70; tail 5.10 to 6.50.

174. Nighthawk. Chordeiles virginianus virginianus (*Gmelin*). (420)

Synonyms: Bull-bat, Musquito Hawk, Will-o-the-wisp.—Caprimulgus popetue Vieill. —Chordeiles popetue, Baird.—Caprimulgus virginianus, Gmelin, 1789.—Chordeiles americanus, DeKay.

Plate XXXIX.

The goat-sucker characteristics, plus the white wing-spots, mark this species. See remarks under Whippoorwill and examine plate.

Distribution.—Northern and eastern North America, west to the Great Plains and central British Columbia, and from Labrador south through tropical America to the Argentine Republic.

One of the best known of our summer birds and one of the latest to arrive from the south. It is rarely seen even in the southern counties before the 10th of May and frequently does not arrive until the 15th or 20th. Its nesting is correspondingly late and eggs are rarely found before the first week in June, while many are deposited late in that month or even early in July. Captain Bendire states that the earliest date on which he has known eggs to be deposited in the north was on May 27, in southern Michigan. He further states that as a rule only a single brood is reared in a season, but that a second laying occurs if the first is destroyed. He gives the period of incubation as sixteen days and states that both sexes assist.

The eggs are laid on the bare ground, usually in an open field or on a bare rock, or not infrequently on the flat and gravelled roofs of buildings in cities and towns. We have never known the eggs to be laid in woods or even in the shade of a bush, but invariably in the open. In this respect the bird is entirely unlike the Whippoorwill, which always lays its eggs in the woods. The eggs, according to Ridgway, are pale olive buff, buffy white, grayish white, etc., thickly speckled and dashed with deep brown, olive, blackish, and usually with pale bluish gray. They average 1.19 by .85 inches. In regard to the coloration of the eggs Bendire says "There is endless variation in the markings. Scarcely any two sets resemble each other closely, and I consider the egg of the Nighthawk one of the most difficult ones known to me to describe satisfactorily."

The note of the Nighthawk is a peculiar, loud, nasal call which may be heard at a long distance and once heard is not likely to be confounded with any other bird note. It is, however, very difficult to describe. Bendire speaks of it as "their querulous and squeaky call note sounding like *ah-eek*, *æh-eek*, or *speek-speek*," Chapman, however, describes it better as "a loud nasal *peent.*"

It flies freely by day, but is rather crepuscular than diurnal or nocturnal. During its southward migrations it may be seen in large, loose flocks flying in the bright sunlight, and at almost any time of day, but it seldom feeds freely at such times, hunting mostly on cloudy days and particularly during the morning and evening twilight. During moonlight nights it may fly all night, but except when feeding young this does not seem to be its usual custom.

During the mating season the male rises to a considerable height and then suddenly dives toward the earth with incredible velocity, checking itself suddenly, sometimes when within a few yards of the ground, and sweeping upward again nearly to its original height. As it checks itself in its fall the air rushing between the primaries produces a peculiar roaring sound which has been aptly likened to the sound made by blowing into the bunghole of an empty cask. When children we were told that this sound was made by the whistling of air through a hole in the wings, and the white spot in either wing was pointed out as the actual hole. It is needless to say that the white spot has nothing to do with the sound, which is similar to that produced by several other species under similar circumstances, notably by Wilson's Snipe.

This species is well distributed over the state, fairly abundant in most sections, and well known to most dwellers in the country. Under such circumstances it is amazing that it is so generally confounded with the Whippoorwill. True, the two birds are close relatives, but they are decidedly unlike in shape, coloration and habits. The Nighthawk has long pointed wings, each with a conspicuous white spot, a somewhat forked tail, and under parts strikingly barred crosswise with black and white. The Whippoorwill has comparatively short and rounded wings, a rounded tail, and under parts streaked and mottled but scarcely barred. The Whippoorwill is practically restricted to the woods, rarely visits the open fields until after dark, and seldom makes long flights in search of food, being content to flit about here and there, alighting frequently on fenceposts, boulders, or on the ground, in order to pick up insects. It is never seen flying high in the air by daylight, and finally its eggs are laid always in the woods, and though shaped like those of the Nighthawk are very differently colored.

The food of the Nighthawk consists entirely of insects, the great majority of which are taken on the wing. It seems to be remarkably fond of ants and as many as 1800 ants have been found in a single stomach. These of course are the winged ants, the mating swarms, which fly in such numbers in afternoon and evening, particularly in the late summer. Beetles of various kinds are also eaten freely, and among them have been found a few Colorado potato bugs and striped cucumber beetles. In addition, flies, moths, grasshoppers, and an immense variety of other insects are taken. The birds become very fat in the fall and when moving southward in large numbers during the latter half of August they are sometimes shot for food, particularly at the south. Unquestionably they are valuable allies of the agriculturist and should be rigidly protected from destruction.

Up to about 1897 the Nighthawk was a very abundant bird throughout Michigan, as elsewhere at the north. Each year, late in August, great flocks appeared in the afternoon, and sometimes for an hour or two the air would be fairly alive with them, all feeding more or less, but steadily working southward. Then followed a decade of rapid and marked decrease; migrating flocks were no longer seen and it seemed possible that the complete extermination of the species might be at hand. Since 1906, however, there has been a decided gain in numbers, and with better legislation and the grow-

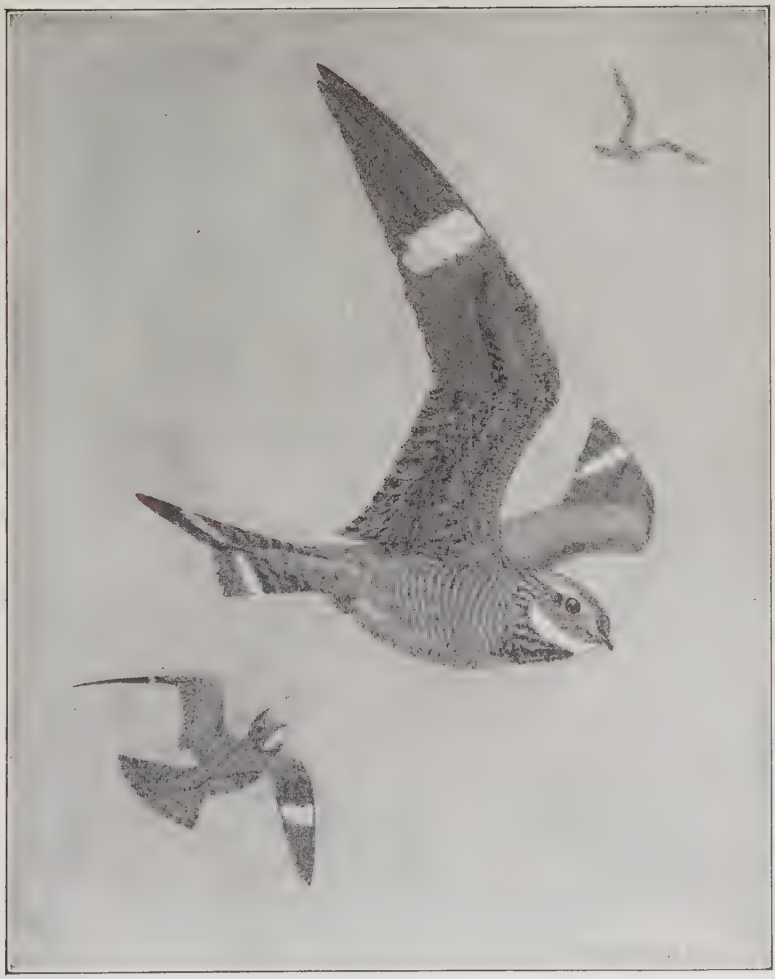

Plate XXXIX. Nighthawk.

Courtesy of National Committee of Audubon Societies.

ing sentiment for protection of all our insect eating birds it seems likely that the species may regain its former numbers.

TECHNICAL DESCRIPTION.

This bird has the general appearance of the Whippoorwill, together with the small bill large eye, weak feet and pectinate middle claw; the bristles about the mouth, however, are very small, the wings are long and pointed, and the tail is emarginate or somewhat forked.

Adult male: Upper parts black, more or less spotted or mottled with buff or rusty on top of head, back and scapulars, and with whitish on the wing-coverts; sides and back of neck with series of buffy spots forming imperfect stripes; a whitish line over the eye; a broad v-shaped white collar on the middle throat; chin and lower throat blackish, spotted with buff or white; rest of under parts narrowly and evenly barred with blackish and pure or buffy white; primaries black, with a conspicuous white patch crossing most of them about the middle and looking like a hole through the wing as the bird is seen flying overhead; tail black or brownish-black, with five or six narrow and imperfect whitish crossbars and a broad pure white band near the end; iris dark brown.

Adult female: Very similar to male, but the v-shaped collar buffy instead of pure white, the white wing-patch smaller, the white tail-band altogether wanting, and the under parts more buffy or rusty. Young: Similar to female, but more mottled above and less distinctly barred below.

Length 9 to 10 inches; wing 7.30 to 8.25; tail 4.30 to 4.75.

Family 48. MICROPODIDÆ. Swifts.

(Only one species found in Michigan.)

175. Chimney Swift. Chætura pelagica (*Linn.*). (423)

Synonyms: Swift, Chimney Swallow, Chimney Sweep.—Hirundo pelagica, Linn., 1758. —H. pelasgia, Linn. 1766.—Cypselus pelasgia, Aud.

Plate XL and Figure 92.

Known readily by its uniform sooty color, with slightly paler throat, and the short stiff tail, each feather pointed with a strong sharp spine (Fig. 92).

Distribution.—Eastern North America, north to Labrador and the Fur Countries, west to the Plains, and passing south of the United States in winter at least to Jalapa, Mexico, and Cozumel Island.

The Chimney Swift is an abundant summer resident throughout the entire state, apparently as numerous along the Lake Superior shore as in the southern counties. It arrives from the south the last of April or first of May, coming usually in flocks of considerable size and attracting attention at once by its sharp twittering, the only note commonly uttered by the bird.

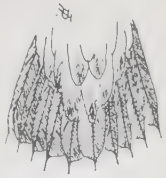

Fig. 92.
Tail of Chimney Swift.

It begins to nest soon after its arrival, but apparently few eggs are laid before the last of May or the first of June. We have records of fresh eggs on June 8 and June 17 in Kalamazoo county, and there is little doubt that the bird rears a second brood in most parts of the state during July. While it nests most commonly in chimneys, placing the nest from five to twenty feet from the top, it is also known to nest somewhat frequently on the insides of barns, and less often still in hollow trees. The latter method undoubtedly was once its universal custom, and probably in many parts of the state the nest is still so placed, but owing to the habits of the bird, and its abundance everywhere, the fact escapes notice. Dr. W. H. Dunham, of Kalkaska, states that in Kalkaska county it is an abundant summer resident and nests in hollow trees and also in wells, placing the nest in the latter case from six to eight feet below the surface.

The nest is made of small twigs broken by the bird from the tips of dead branches and fastened to each other and to the wall by the gummy saliva of the bird, which is especially modified for this purpose. The nest is often only a narrow platform, at first barely large enough for the five or six pure white, unspotted, elongated eggs, but later the platform is enlarged and the edge turned up so as to make it more or less saucer-shaped. At best, however, it is small and shallow and never contains any lining. The young are fed for a time in the nest, but usually after the second week they get out of the nest and cling to the wall near it. According to very careful observations made by Otto Widmann of St. Louis, Mo., the period of incubation is about eighteen days, and about thirty days more is required before the young are able to fly. Mr. Widmann does not believe that two broods are reared in Missouri, but thinks that the first nesting is very uncertain, depending largely on the weather, and that consequently some birds get their young on the wing while others are still incubating eggs.

The food of this species consists entirely of winged insects, which are very largely two-winged flies, and presumably it is decidedly beneficial. It has been claimed that this bird, as well as some of the true swallows, carried bedbugs from house to house, but there seems to be nothing whatever to warrant such a belief.

In collecting twigs for the nest there is some difference of opinion as to the action of the bird. Some observers claim that the twig is seized with the feet and broken off by the weight of the bird, and that the twig is then carried away in the feet. On the other hand, most observers apparently think that the twig is seized in the beak and held there during the flight to the nest. More careful observations on this point are desirable.

The spring arrival of the Swift is quite variable in different seasons, ranging in southern Michigan (Petersburg) from April 13, 1885 to May 12, 1902, but the average date for that locality is not far from May 1st. At Bay City the arrivals average three or four days later, and at the Sault a week or ten days later.

Sometimes on their first arrival in spring, but more commonly in late summer after most of the young are on the wing, the Swifts gather in large flocks toward nightfall, and after sweeping in great circles about some favorite chimney, they form a conical cloud, somewhat like a cyclone funnel, and drop rapidly from the apex into the chimney, where they roost for the night. Favorite resorts of this kind, usually abandoned factory chimneys or the unused chimneys of public buildings, are thus occupied year after year, but apparently these places are never used for nests. The earlier naturalists record the use of hollow trees in the same manner, and Mr. J. Foster, of Pompeii, Mich., tells us that several years ago, while coming down the Maple River, in Gratiot county, not far from Washington township, just after daylight he saw an immense flock of Swifts come out of "a big hollow stub" close to the river.

TECHNICAL DESCRIPTION.

General color dark sooty brown, usually with a greenish tinge, blackening on top of head, on lores, and on outer wing-feathers, lightening to grayish brown on rump, upper tail-

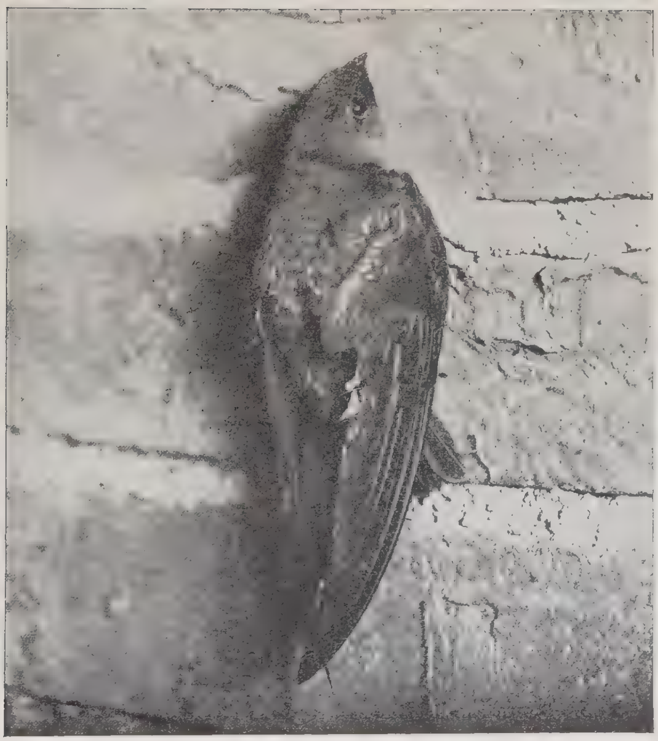

Plate XL. Chimney Swift.

Photograph from life by R. H. Beebe. Courtesy of Bird Lore.

Plate XLI. Hummingbird on nest.

Photograph from life by Frank M. Chapman. (Bird Lore.)

coverts and upper surface of tail, and to grayish white on the chin and throat; shafts of wing and tail-feathers shining black, those of the tail prolonged one-fourth to one-half an inch beyond the vanes of the feathers as stiff and very sharp spines; bill and feet black; iris dark brown. Sexes alike in size and color, and young scarcely different.

Length 4.75 to 5.50 inches; wing 5 to 5.25; tail 1.90 to 2.15.

Family 49. TROCHILIDÆ. Hummingbirds.

(Only one species found in Michigan.)

176. Ruby-throated Hummingbird. Archilochus colubris (*Linn.*). (428)

Synonyms: Hummingbird, Common Hummingbird, Hummer, Ruby-throat.—Trochilus colubris, Linn. 1758, and most recent authors.

Plate XLI.

This, the smallest of our birds, measuring always less than four inches from tip of bill to tip of tail, is not likely to be mistaken for any other species, its metallic colors and humming flight, in connection with its diminutive size, rendering such an error impossible. Not infrequently, however, it is mistaken for one or another of our hawk-moths (Sphingidæ), or rather the moth is mistaken for the bird.

Distribution.—Eastern North America to the Plains, north to the fur countries, breeding from Florida to Labrador, and south in winter to Cuba, Mexico and Veragua. A few individuals spend the winter in southern Florida.

The Hummingbird is too well known to need description. In Michigan it appears with the bloom on the apple orchards, rarely before the first of May, often not before the 10th of the month even in the southernmost counties. The average in ten years at Petersburg, Monroe county, is May 8, while at Bay City it appears nearly ten days later. It is not uncommon in any part of the state, but appears to be most abundant in cultivated districts where an abundance of bloom is to be found. It is frequently seen however, in the depths of the forest, and a prettier sight can hardly be imagined than two or three of these beautiful birds, in full spring plumage, visiting the brilliant blossoms of the columbine in some quiet place in the deep woods.

As is well known, this bird feeds largely upon the nectar of flowers, but it undoubtedly eats numberless small insects at the same time. These have been found in considerable numbers in its stomach, and it has been seen to capture plant lice, small spiders, and numerous other small insects, while Professor Aughey records finding four small locusts in the stomach of one taken in Nebraska in June 1875. Nevertheless it seems probable that its principal food is the nectar of flowers and other sweet vegetable juices. It visits the bark punctures made by the Sapsucker, drinking the sweet sap with avidity, and in autumn it sucks the sweet juices from bruised or injured fruits, particularly pears, although there is no reason to suppose that it ever attacks sound fruit of any kind.

The nest is one of the daintiest built by birds and is usually so skilfully placed and so carefully covered with lichens, moss, cobwebs and other materials as to be readily taken for a knot or excrescence on the branch of a tree, so that it is not easily discovered. The bird generally selects a more or less horizontal branch, at no great height above the ground and usually at some little distance from the trunk of the tree, commonly saddling the nest on a branch an inch in diameter or less. Occasionally it is placed in a small fork, and more rarely still in one of the main forks of a large tree. It is built of various soft fibers, mainly or entirely vegetable, among others the down from various kinds of ferns, the milkweed down, and the silky filaments from different kinds of willows and poplars. These are held together largely by spider's silk, and the whole structure averages about one and one-half inches in diameter outside and a little less in depth. Internally the cup is about an inch across and a little more than half an inch deep. The eggs are invariably two, pure white, with a polish, nearly elliptical in shape, and average .50 by .31 inches. They are laid, in this latitude, in June, the date varying somewhat with the season and locality. There is some reason to believe that a second brood is reared in August, but we have no positive evidence in support of this, except that Mr. B. H. Swales found two fresh eggs in the vicinity of Detroit, July 15, 1896, and the late R. B. Westnedge found two eggs far advanced in incubation, July 26, 1891, at Kalamazoo. The earliest record, furnished by the same collector, is of two fresh eggs taken June 3, 1892 in Kalamazoo county, and his notes refer to other nests as follows: Fresh eggs June 16 and June 23, 1888, June 10, 13 and 15, 1891. At Plymouth, Wayne county, J. B. Purdy found nests on June 11 and June 18, 1904.

The parent often betrays the location of the nest by diving at the passerby, swooping back and forth past his head like an angry bumblebee. While this action does not invariably indicate the proximity of a nest this is usually the case.

Probably the Hummingbird is not particularly valuable on account of any service rendered the agriculturist, but it is known to aid in the cross-pollination of flowers, and it probably at the same time distributes some plant diseases, as has been shown to be the case with pear-blight. When visiting flowers with deep tubular corollas, like those of the trumpet creeper (*Bignonia*), it frequently pierces the corolla near the base, thus reaching the nectar without being compelled to enter the corolla bodily.

Its ordinary note is a high-pitched, insect-like chirp repeated many times in succession, especially when two birds are chasing each other and when two males give battle, as they frequently do.

Although commonly supposed to be very sensitive to cold, and individuals are sometimes found apparently benumbed and unable to fly on very cool mornings, yet the bird seems to be in no hurry to move southward in the fall, remaining always until after the first of September, and not infrequently until the very end of the month. In fact, October records are not particularly rare; Major Boies records seeing one in October on Neebish Island, in the St. Mary's River, and Swales found several near Detroit on October 2, 1893.

TECHNICAL DESCRIPTION.

Adult male: Upper parts uniform metallic brassy green, as are also the sides and flanks; entire chin and throat rich metallic ruby-red ending sharply against the grayish white breast, which darkens to dull gray on belly and under tail-coverts; wings purplish brown above; tail similar but blacker, forked; bill black; iris dark brown.

Adult female: Similar above to male, but duller green on head; throat grayish, without trace of metallic coloring; rest of under parts dull whitish; tail double-rounded, not forked, the middle pair of feathers entirely green, the rest green at base with a broad sub-terminal black bar, the three outer pairs tipped with white. Immature birds resemble the adult female, but sex is indicated by shape of tail.

Length 3.25 to 3.85 inches; wing 1.60 to 1.80; tail 1.20 to 1.25.

Order XVII. PASSERES. Perching Birds.

This, by far the largest order represented in the state, contains nineteen families and about one hundred and fifty species, or approximately one-half the bird-species of the state. Although known collectively as Perching Birds or The Perchers, they are by no means the only birds which perch, and moreover many species within the order are mainly if not entirely terrestrial, for example the Horned Larks, the Tit-lark, the Longspurs and a few others. Eighteen of the families are grouped under the Suborder Oscines, or Singing Birds, the remaining family, the Tyrannidæ, alone representing in Michigan the Suborder Clamatores, or Songless Perchers.

KEY TO FAMILIES.

1. Upper mandible distinctly hooked, toothed, or notched at tip. A, AA.
    A. The tips of mandibles crossed laterally (Fig. 111). Crossbills. Family 56. Fringillidæ.
    AA. The tips of mandibles not crossed laterally. B, BB, BBB.

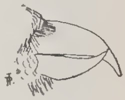
Fig. 111.

        B. Bill strongly hooked and toothed, compressed (higher than wide at base), with four or five strong bristles on the rictus (upper edge of mouth near corner) (Fig. 130). Family 60. Laniidæ. Shrikes.

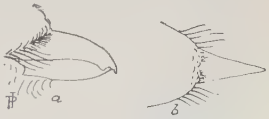

Fig. 130.

        BB. Bill slightly hooked and toothed, depressed (wider than high at base) with four or five bristles on the rictus (Fig. 93). Family 51. Tyrannidæ. Flycatchers.

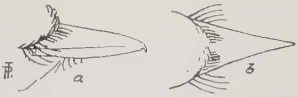

Fig. 93.

        BBB. Bill slightly hooked or notched, about as wide as high at base. S, SS.
            S. Head with a prominent crest, no bristles on the rictus (Fig. 129). Family 59. Bombycillidæ. Waxwings.
            SS. Head without crest, rictus with three bristles (Fig. 132.) Family 61. Vireonidæ. Vireos.

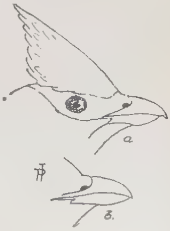

Fig. 129.

2. Upper mandible indistinctly or not at at all hooked, toothed or notched at tip. C, CC.
    C. Tips of folded wings reaching beyond tips of middle tail-feathers. D, DD.
        D. Tail more or less forked (Fig. 123), or first primary longest, or both. Family 58. Hirundinidæ. Swallows.
        DD. Tail square or rounded, first primary only one-third as long as longest (Fig. 147). Some Nuthatches. Family 69. Sittidæ.

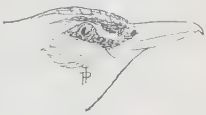
Fig. 132.

CC. Tips of folded wings not reaching to tips of middle tail-feathers. E, EE.

E. Head crested (Fig. 129), tail tipped with bright yellow. Family 59. Bombycillidæ. Waxwings.

EE. Crested or not, the tail not tipped with bright yellow. F, FF, FFF.

F. First primary much more than half as long as the longest. (Fig. 108.) G, GG.

G. Tertiaries in folded wing reaching nearly to tips of primaries. Meadowlark and Pipit. Families 55 and 64.

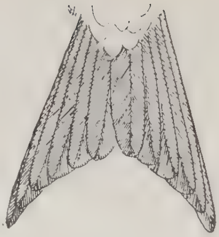
Fig. 123.

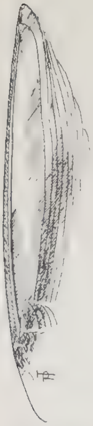
Fig. 108.

GG. Tertiaries not reaching nearly to tips of primaries. H, HH.

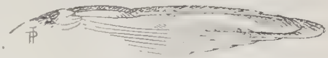
Fig. 147.

H. Claw of hind toe little curved, at least twice as long as claw of middle toe (Fig. 97). I, II.

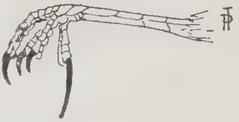
Fig. 97.

I. Chin and throat yellow or yellowish; a feather horn on each side of crown (Fig. 96). Family 52. Alaudidæ. Horned Larks.

II. Chin and throat without trace of yellow; no feather-horns. Longspurs and Snow Buntings. Family 56. Fringillidæ.

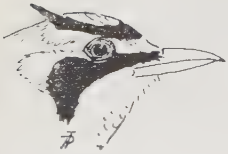
Fig. 96.

HH. Claw of hind toe much curved, less than twice the length of the middle claw (Fig. 102). J, JJ.

J. Cutting edge of upper mandible with a low tooth-like lobe or projection about midway (Fig. 122); plumage mainly red and black or black and olive. Scarlet Tanager. Family 57. Tangaridæ.

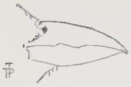
Fig. 122.

JJ. Cutting edge of upper mandible without tooth-like lobe. K, KK.

K. Bill conical, short, its height at base one half or more of the length of culmen (Fig 120). L, LL.

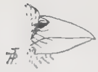
Fig. 120.

L. First or second primary longest; nostrils not covered by bristles; outer tail-feathers shorter than middle ones. Cowbird and Bobolink. Family 55. Icteridæ.

LL. First and second primary not longest, or if so, the nostrils hidden by bristles, or the tail more or less forked, or both. Family 56. Fringillidæ. Sparrows, Finches, Grosbeaks, etc.

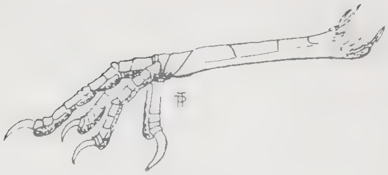
Fig. 102.

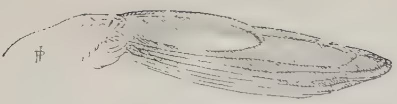

Fig. 145.

KK. Bill conical, longer, its height at base equal to or less than one-half the culmen (Fig. 106). M, MM.

M. Birds 6 to 12 inches long, the wing (except in the Orchard Oriole) always exceeding 3¼ inches. Family 55. Icteridæ. Orioles and Blackbirds.

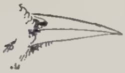

Fig. 106.

MM. Birds 4½ to 7½ inches long, the wing seldom exceeding 3 inches, never more than 3½ inches. Family 63. Mniotiltidæ. Wood Warblers.

FF. First primary about one-half the length of the longest (Fig. 145). N, NN. (See also FFF).

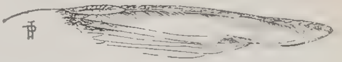

Fig. 151.

N. Tail-feathers with soft, rounded tips. O. OO.

O. Wing less than 4.75 inches. P, PP.

P. Head crested. Tufted Titmouse. Family 70. Paridæ.

PP. Head not crested. Family 67, Troglodytidæ, Wrens, and Family 66, Mimidæ, Thrashers.

OO. Wing 5 inches or more. Family 53. Corvidæ. Crows and Jays.

NN. Tail-feathers stiff, sharp-pointed. Family 68. Certhiidæ. Creepers.

FFF. First primary not more than one-third as long as the longest (Fig. 151). Q, QQ.

Q. First primary about one-third as long as the longest. R, RR.

R. Wing less than 2⅓ inches. Family 72. Sylviidæ. Kinglets and Gnatcatchers.

RR. Wing more than 2⅓ inches. Family 70. Paridæ, Chickadees, and Family 69, Sittidæ, Nuthatches.

QQ. First primary not more than one-fourth as long as the longest (Fig. 151). Family 73. Turdidæ. Thrushes and Bluebirds.

Suborder CLAMATORES. Songless Perchers.

Family 51. TYRANNIDÆ. Flycatchers.

A large family of interesting birds, represented in Michigan by only nine or ten species. All are insect eaters of the best type, and most of this food is taken on the wing, the structure of the entire bird being specially adapted for this work. A characteristic action is the selection of a particular perch from which the flycatcher makes sudden sallies to capture passing insects with an audible snap of the bill, returning directly to the chosen perch to swallow its prey and watch for more. The smaller species are more readily identified by note, action and nest than by plumage.

KEY TO SPECIES.

A. Larger species, wing about four inches or over (3.90 to 4.75). B, BB.
  B. Tail all one color, black or brownish-black. C, CC.
    C. Breast uniform light brownish-gray; belly cinnamon. Say's Phœbe. No. 180.
    CC. Breast dark, mottled olive, divided by a median light stripe; belly yellowish white. Olive-sided Flycatcher. No. 181.
  BB. Tail not of one color. D, DD.
    D. Tail-feathers blackish with conspicuous white tips; crown with a concealed patch of orange. Kingbird. No. 177.
    DD. Tail-feathers (except middle pair) with the inner vanes bright rufous or chestnut. Crested Flycatcher. No. 178.
AA. Smaller species, wing not over 3½ inches. E, EE.
  E. Wing from 3 to 3½ inches. F, FF.
    F. Tail more than 3¼ inches. Phœbe. No. 179.
    FF. Tail less than 3 inches. G, GG.
      G. Upper parts dark olive brown; top of head darker than back; two white wing-bars. Wood Pewee. No. 182.
      GG. Upper parts olive green; top of head same shade as back; two buffy wing-bars. Acadian Flycatcher. No. 184.
  EE. Wing less than 3 inches. H, HH.
    H. Upper parts olive-brown; throat nearly white. I, II.
      I. Wing 2.60 inches or more; wing-bars yellowish. Alder Flycatcher. No. 185.
      II. Wing 2.60 inches or less; wing-bars white. Least Flycatcher. No. 186.
    HH. Upper parts olive-green. J, JJ.
      J. Under parts, including throat and belly, pale sulphur yellow, shaded with olive on sides and breast. Yellow-bellied Flycatcher. No. 183.
      JJ. Throat and belly usually pure white; sides and flanks tinged with yellow. Acadian Flycatcher. No. 184.

177. Kingbird. Tyrannus tyrannus (*Linn.*). (444)

Synonyms: Bee-bird, Bee Martin.—Lanius tyrannus Linn. 1758.—Lanius tyrannus var. carolinensis, Gmel. 1788.—Tyrannus intrepidus, Vieill.—Tyrannus carolinensis Baird, 1858.

Plate XLII and Figure 93.

Easily known by the slate-gray upper parts, pure white under parts, and black tail with conspicuous terminal band of white. The adult has a concealed patch of orange red on the crown which can be displayed or hidden at will.

Distribution.—North America from the British Provinces south in winter through eastern Mexico, Central and South America. Less common west of the Rocky Mountains.

The Kingbird is one of our largest and best known flycatchers, universally

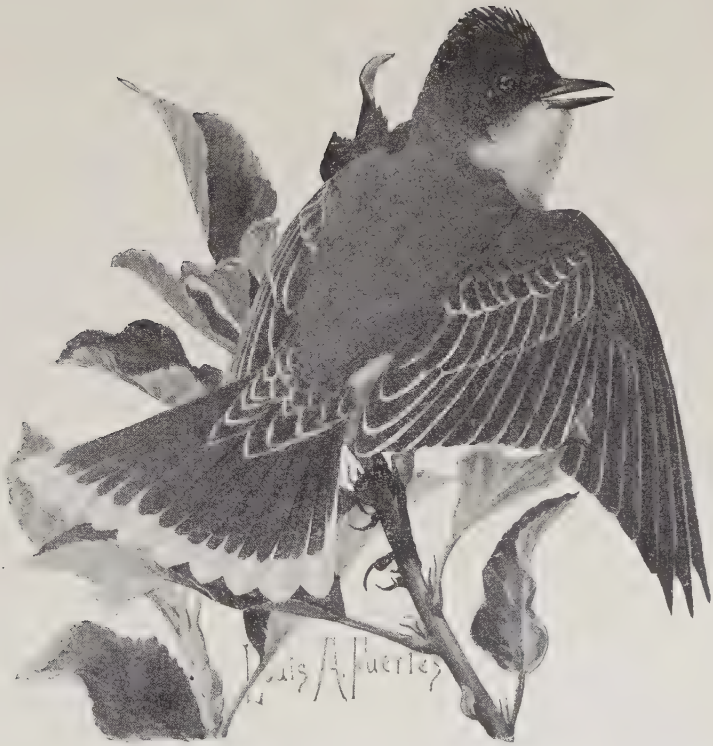

Plate XLII. Kingbird.

From Coues' Key to North American Birds.
Dana Estes & Co.

distributed throughout the state in summer, and nesting freely along our highways and in orchards everywhere. It is noted mainly for its frequent and courageous attacks on crows and hawks, which have won for it the name "Kingbird," and it has also obtained, more or less unjustly, a reputation for the destruction of honey bees which has given it the name of "Bee Martin" or "Bee-bird." Its valor in defence of its nest is not to be doubted, but the facts as regards bee-eating do not warrant the general opinion.

It has been shown most conclusively, by the examination of numerous stomachs, as well as by careful observation of the living bird, that it seldom eats worker bees, usually contenting itself with drones. Of course it makes an occasional mistake and snaps up an armed worker, undoubtedly paying a severe penalty for its carelessness. The stomach examinations just referred to (281 stomachs), made under our own direction, in the U. S. Department of Agriculture, showed that about 90 percent of the food consisted of animal matter, most of which was insects. These included beetles, grasshoppers, butterflies, bees, wasps, two-winged flies, and even caterpillars. There were fifty honey bees in these stomachs, forty of which were surely drones, and only four certainly workers.

The bird feeds much like other flycatchers, selecting a perch from which it makes frequent sallies after passing insects; but it also frequently descends to the ground and picks up insects creeping there. It is fond of the vicinity of water and may be seen frequently dipping its bill after the manner of a swallow, and probably in some cases snapping up insects from the surface of the water. Its characteristic flight, with widely spread tail and quickly vibrating wings, is well known to every observer, and the species may be identified almost as far as it can be seen by its characteristic motions.

The nest is bulky and usually in plain view on the horizontal branch of a scrubby tree, often a thorn tree or a neglected fruit tree in an orchard or by the roadside. Occasionally it nests on the bough of an evergreen, or even on the timber of a bridge or the top of a fence post. but these are departures from its usual custom. Still more unusual is the condition described by R. W. Chaney, in the Hamilton Lake region on the west side of the state. He says: "This species might be considered almost aquatic in its nesting habits, as the nests were invariably placed in stumps projecting out of the water, often at a considerable distance from the shore. Nests with eggs—always three in number—were seen up to the middle of July" (Birds of Mason county, Mich., Auk, XXVII, 1910, 274). The nest is compactly built of grass, bark, roots, strings and often paper and rags, and lined usually with rootlets and slender vegetable fibres. The eggs are four to six, pure white or creamy white, boldly spotted and blotched with various shades of brown and lilac, and average .95 by .69 inches. They are among the handsomest eggs laid by our small birds.

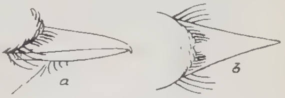

Fig. 93.
Bill of Kingbird.

The Kingbird arrives from the south late in April or early in May, and the nest is built during the latter half of May, often not until the first of June. Fresh eggs are likely to be found in the southern half of the state during the first week in June, although many are not laid until the middle of the month. Not infrequently nests with eggs of young are found in July, indicating a second brood, but it seems likely that these are mostly the nests of birds who have been unsuccessful in their first attempt.

In August the Kingbirds often gather in small companies and feed ravenously on berries of sassafras and spice bush and to a less extent on wild cherries, June berries (*Amelanchier*), honeysuckle, blackberries and a few other species. They begin to move southward by the first of September and are all gone by the end of the month.

There has been much speculation about the use of the brilliant crown-patch of the Kingbird, some writers claiming that the birds use this as an imitation flower to attract insects, snapping them up as they come within reach. Actual observation of this performance does not seem to have been recorded and it would be well for those who have opportunity to watch hungry Kingbirds in reference to this alleged habit, and publish the results.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Top and sides of head clear black, the middle of the crown with a concealed patch of orange red; rest of upper parts slate gray, most of the wing-coverts as well as the tertiaries and some of the secondaries, narrowly edged with white; under parts pure white shaded with gray along the sides and across the breast; tail square or slightly rounded, clear black, each feather conspicuously tipped with white; bill and feet black; iris brown.

Immature: Similar to adult, but red of crown entirely absent, and most of the light edgings above tinged with rusty.

Length 8 to 9 inches; wing 4.45 to 4.75; tail 3.40 to 3.75; culmen about .60.

178. Crested Flycatcher. Myiarchus crinitus (*Linn.*). (452)

Synonyms: Great Crested Flycatcher, Snake-skin Bird.—Turdus crinitus, Linn., 1758.—Muscicapa crinita, Linn., 1766.—Muscicapa ludoviciana, Gmel.

Figure 94.

The ashy gray throat and breast and sulphur yellow belly mark this bird among the other flycatchers, and the cinnamon edgings of the wing and tail feathers serve to clinch the identity. The "crest" is no larger than in most other members of the family.

Distribution.—Eastern United States and southern Canada, west to Manitoba and the Plains, south through eastern Mexico to Costa Rica, Panama and Columbia. Breeds from Florida northward.

A rather common bird in most parts of the state, but nowhere abundant, and less often seen toward the north, although occasional pairs are found along the south shore of Lake Superior, and Major Boies noted it occasionally on Neebish Island in the St. Mary's River, about 46° 20′ north. It arrives from the south rather late, rarely before May 1 in the southern counties, and a week or ten days later in the north. At Petersburg Trombley's earliest record is April 27, 1888, but Swales noted one at Detroit, April 9, 1889. It moves southward again in September, only stragglers being seen after the middle of the month.

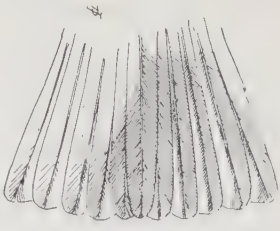
Fig. 94.
Tail of Crested Flycatcher.

It shows a preference for the forest and is shyer than most of the flycatchers. Its favorite perch is the top of some high tree (not necessarily a dead one), and its loud parrot-like calls and whistles can be heard at long distances. Major Bendire says: "It utters a variety of sounds; the most common is a clear whistle like 'e-whuit-huit,' or 'wit-whit, wit-whit,' repeated five or six times in a somewhat lower key, and varied to 'whuir, whuree,' or 'puree,' accompanied by various turns and twistings of the head. Its alarm note is a penetrating and far-reaching 'wheek, wheek.'" Bicknell says the birds are nearly silent through most of July and August and use only low notes until they depart.

The nest is built late in May or early in June; E. B. Schrage taking a set of five eggs at Pontiac June 4, 1896, and R. B. Westnedge a set of six at Kalamazoo June 10, 1891. Possibly a second brood is sometimes reared, since we have several records of eggs in July. Mr. W. Wilkowski states that at Kalamazoo, July 11, 1902, he found a nest containing ten eggs evidently laid by two different females, since five were heavily blotched and the other five thinly marked. The period of incubation is commonly given as fifteen days. The nest is always placed in a hollow of some kind, usually in the branch of an orchard tree, or the dead limb of some large tree in the forest. It is made of a great variety of fibrous materials, but usually has tufts of hairs, roots, grasses, feathers, and almost invariably pieces of cast snake-skin, sometimes entire skins. Various explanations have been suggested for this use of snake skins, the most common being that the skins are supposed to protect the nest from the intrusion of enemies, but this is extremely doubtful. The eggs are four to seven, rarely three or eight, while five or six is the usual number. They have a buffy ground color profusely marked with streaks, lines, and spots of darker color, commonly reddish brown, purple and lavender. "Pen markings" usually predominate and the eggs can hardly be confounded with those of any other Michigan bird. They average .88 by .66 inches.

The food consists mainly of insects and if more abundant the bird could be counted as one of the farmers' good friends, although it eats such a variety of insects that the problem is by no means simple. It also eats some small fruits, including blackberries, wild cherries, and the fruits of honeysuckle, sassafras and spice bush.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Upper parts clear olive or grayish brown, the top of head darker and browner; most of the primaries edged externally with rusty (rufous), and the coverts and tertiaries with white or buffy; throat and chest clear ash-gray, shading into sulphur-yellow on the lower breast, belly, sides and under tail-coverts; edges and lining of wings also yellow; middle pair of tail-feathers entirely brown, the rest brown on the outer webs, rufous or chestnut on inner webs; bill brownish; feet black; iris brown.

Immature: Scarcely different from adults, but colors not so pure, and feathers of back and wings, often with rusty edgings.

Length 8.50 to 9 inches; wing 3.90 to 4.40; tail 3.50 to 4.20; culmen about .75.

179. Phœbe. Sayornis phœbe (*Lath.*). (456)

Synonyms: Phoebe Bird, Pewee, Bridge Pewee, Water Pewee, Barn Pewee, Beambird, Pewit Flycatcher.—Muscicapa phœbe, Latham, 1790.—Muscicapa fusca, Gmel. 1788.—Tyrannus fuscus, Nutt.—Sayornis fuscus, Baird.

May be recognized by its action and note, not by shape or color, at least not by amateurs. The lack of conspicuous wing-bars, the white edging of the outer tail-feathers, the nearly white (slightly yellowish) under parts, are helpful points with a specimen in hand. Probably the most characteristic action of the bird is the constant dropping and flirting of the tail.

Distribution.—Eastern North America, west to eastern Colorado and western Texas, and from the British Provinces south to eastern Mexico and Cuba, wintering from the south Atlantic and Gulf States southward. Breeds from South Carolina northward.

This is an abundant summer resident throughout the state, arriving early and staying late; generally distributed, but perhaps somewhat less common in the most northern parts of the Lower Peninsula and in the Upper Peninsula. Sometimes it arrives from the south before the middle of March (Petersburg, March 10, 1887, March 10, 1894, March 17, 1889), but the average date of arrival for southern Michigan is not far from March 20, while occasionally it is not seen until the first week in April. It lingers late into October—sometimes even into November, but does not then haunt the waterside as in spring.

It shows a great fondness for the vicinity of water and often builds its nest under bridges and culverts or on the rafters, cornices and other favorable parts of buildings close to the water. Not infrequently it is placed on a ledge of rock in a river gorge, railroad cut, or entrance of a mine shaft or tunnel; less often on a root or stump under a projecting sandbank. The nest itself is made of various soft substances such as grasses, mosses, roots, hairs, wool, and plant fibres, usually mixed with more or less mud, though this may be absent. The eggs are commonly four or five, more rarely three or six, pure white and unspotted, but occasionally one or two eggs in a set will show a few dots of brown. The eggs average .84 by .55 inches and the period of incubation is about twelve days. The nest often becomes infested with vermin, the most common parasite being a mite which occurs in millions. In one case after the young left a nest over our front door these mites invaded the house and caused more or less trouble for several days.

The note of the Phœbe is not easily described. We have never been able to detect any resemblance to the word phœbe or pe-wee. Bendire says: "They appear rather to approach the words *see-hee*, *see-hee*, and are sometimes varied to '*see-bee*,' with the accent on the last syllable." The clear, long-drawn, plaintive-whistled *pe-wee* of late winter and early spring is given by the Chickadee, weeks or even months before the Phœbe appears.

The food is almost entirely insects, and the bird is valuable in keeping down mosquitos, gnats and flies, as well as other insects.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Top and sides of head smoky brown, often blackish; rest of upper parts grayish-olive, the wing-coverts and tertiaries narrowly tipped and margined with whitish; under parts dull whitish, just tinged posteriorly with yellowish, the sides of the breast and often the chin, strongly shaded with the color of the back; wing and tail feathers blackish, the narrow outer web of the outer tail-feather pure white except near tip; bill and feet black; iris brown. The female is slightly smaller than the male. Young are scarcely different from adults, but at first show many rusty edged feathers.

Length 6.25 to 7 inches; wing 3.25 to 3.55; tail 3.45 to 3.75; culmen .45 to .50.

180. Say's Phœbe. Sayornis sayus (*Bonap.*). (457)

Synonyms: Muscicapa saya, Bonap. 1825.—Tyrannus saya, Nutt.—Tyrannula pallida, Swains.—Sayornis sayus, Baird.

Similar in general to the common Phœbe, but slightly larger, the bill somewhat narrower, the belly cinnamon, and the tail black.

Distribution. Western United States from the Plains to the Pacific; north along the Yukon River to the Arctic Circle; south to Cape St. Lucas and over the Mexican Plateau to Puebla and central Vera Cruz. Accidental in Massachusetts.

This bird seems to be purely accidental in Michigan. But one capture is recorded, a specimen taken by Rev. Chas. Fox at Owosso, Shiawassee county, in July, 1853. This capture seems to have been the source of several distinct records, one by Stockwell, in Forest and Stream, another by Miles, in his list of 1860; and this in turn quoted by Swales, 1903, but the locality given as Grosse Isle. Dr. Miles says of his own list "The species in the catalogue marked 'a' were obtained at Grosse Isle, Wayne county, by Prof. Fox and are given on his authority." In this list Say's Flycatcher is preceded by an "a" and it is therefore possible that a second specimen was taken at Grosse Isle, though it seems more likely that the intention was merely to indicate that it was one of Fox's records. Miles' statement is perfectly clear as to the Owosso specimen, and it would be a remarkable coincidence if Fox should have taken a second specimen of this bird at Grosse Isle. Unfortunately Fox's original list, which was almost certainly published, cannot be found. The color of this bird is so unlike that of any other flycatcher that it can hardly be mistaken, but there is little likelihood that it will be met with again in Michigan.

TECHNICAL DESCRIPTION.

Adult: "Lateral tail-feathers edged with whitish; belly light cinnamon or tawny ochraceous. Above light brownish gray, the tail black; anterior lower parts light brownish gray, posterior portions light cinnamon or tawny ochraceous; length about 7.50 to 8.05 inches; wing 3.90 to 4.25; tail, 3.35 to 3.75" (Ridgway).

181. Olive-sided Flycatcher. Nuttallornis borealis (*Swains.*). (459)

Synonyms: Nuttall's Pewee.—Tyrannus borealis, Swains., 1831.—Muscicapa inornata, Nutt.—Contopus borealis, Baird.

Known by the conspicuous tuft of white fluffy feathers on the flank together with its comparatively large size, seven to eight inches long. It is not likely to be confounded with anything except the Wood Pewee, which is smaller and unstreaked on the under parts.

Distribution.—North America, breeding from the northern and higher mountainous parts of the United States northward to British Columbia and the Saskatchewan River. In winter south to Central America, Columbia and northern Peru.

This is one of our rarer flycatchers, occurring in the southern half of the state as a migrant only, passing through during the latter half of May and returning from the north late in August. Like many other migrants it seems to be more frequently observed near the lake shores on the east and west sides of the state. In Ottawa county Dr. Gibbs recorded it on May 21, 1879, May 17, 1880, May 9, 1882 and May 25, 1883. One was seen in Kalamazoo county, May 22, 1885. Prof. Frank Smith records it at Macatawa, Ottawa county, as follows: One specimen each on August, 17 1903, and August 21, 1904, and one specimen August 15, 1905. There is a pair in the museum of the University of Michigan taken near Ann Arbor, May 28, 1896.

Throughout the higher parts of the northern half of the Lower Peninsula this bird occurs sparingly as a summer resident. Widmann met with it near Harbor Springs, Emmet county, in July, 1901; S. E. White took a specimen at Mackinac Island, August 15, 1890; on the Charity Islands, Saginaw Bay, N. A. Wood found it from August 18 to October 10, 1910; Wood and Frothingham saw it in Crawford County, June 16, and Oscoda county, June 18, on the tops of pines, where it was rare, and Wood again recorded it several times in Ontonagon county in July and August, 1904, and found it common on Isle Royale from August 17 to 28 the same year; the writer saw two individuals along the Au Sable at Grayling, Crawford county, June 8, 1902, and F. H. Chapin records it as seen in Emmet, Cheboygan and Charlevoix counties in August and September. E. A. Doolittle found several in Baraga and Marquette counties in June, 1905, and several pairs on Grand Island, Munising Harbor, in the summer of 1906. Max M. Peet noted it on Isle Royale, Lake Superior, in 1905, as follows: "Seen at Rock Harbor in the tamarack and spruce swamps; Siskowit Bay and Washington Harbor, July 17 to September 3. A rather common resident and probably nesting, although no nests were found. A pair was taken July 17 in a tamarack swamp. In nearly every swamp visited two or three pairs were found. As a rule found in pairs, sometimes with a third, perhaps a young one" (Rep. Mich. Geol. Surv., 1908, p. 358). So far as we know no Michigan nest is recorded, but there can be no doubt whatever that the bird breeds wherever found between the middle of June and last of July.

The nest is commonly placed in an evergreen, a horizontal branch being preferred, and at a height of fifteen to fifty feet from the ground. It is built of twigs, roots and moss, is decidedly small considering the size of the bird, but very compactly built and securely lodged in its place, although so shallow that the eggs may be easily shaken out. These are usually three in number, cream colored, spotted with different shades of brown and purple, somewhat resembling large specimens of the Wood Pewee's eggs. They average about .82 by .71 inches. Captain Bendire states that the period of incubation does not exceed fourteen days, and that the young are said to remain in the nest about three weeks.

The Olive-sided Flycatcher has a habit of perching on the tops of high trees, either green or dead, from which it makes long sallies after insects and utters occasionally its loud and striking call notes. These are very differently described by different writers, but to us they always suggest the note of the Piping Plover. Bendire compares the ordinary call to that of the Wood Pewee, but states that it consists of three notes like "hip-pui-whee," while the alarm note he gives as "puip-puip-puip."

The food consists mainly of winged insects, and in so far as we know, the bird must be considered beneficial to the agriculturist and forester.

TECHNICAL DESCRIPTION.

Adult: Upper parts dark brownish olive, blackish on top of head, many feathers with blackish centers; wings and tail clear brownish black (fuscous), the tertiaries and some of the wing-coverts with grayish or whitish margins; chin, throat and belly white or yellowish, and often a narrow stripe of this color along the middle of breast; rest of under parts olive like the back, most of the feathers with blackish centers, giving a mottled or streaked appearance; a conspicuous tuft of yellowish downy feathers on the flank; upper mandible dusky; lower mandible yellowish except at tip, where dusky; feet black, iris brown.

Length 7.10 to 7.90 inches; wing 3.90 to 4.50; tail 2.80 to 3.50; culmen .58 to .70.

182. Wood Pewee. Myiochanes virens (*Linn.*). (461)

Synonyms: Pewee Flycatcher, Pewee.—Muscicapa virens, Linn., 1766.—Muscicapa querula, Vieill.—Muscicapa rapax, Wilson.—Tyrannus virens, Nutt.—Contopus virens, Cabanis and most recent authors.

So similar to the other small flycatchers that no single diagnostic mark can be given. Perhaps the best character lies in the somewhat conspicuous white wing-bars, these being buffy or brownish in some others and almost lacking in the Phœbe, with which the Wood Pewee is most likely to be confounded. The present species is not quite so large as the Phœbe, has a shorter tail proportionally, and its bill is decidedly broader.

Distribution.—Eastern North America, west to the Plains, and from southern Canada southward, migrating through eastern Mexico and Honduras to Columbia and Equador; breeds from Florida to Newfoundland.

The Wood Pewee is generally distributed throughout Michigan, its abundance depending apparently on local conditions and not on latitude or altitude. Other things being equal, it seems to prefer decidous woods, but it is frequently found along the edges of white pine tracts or even in the depths of hemlock and spruce timber.

It is one of the latest of our birds to come from the south, also one of the most regular. In the latitude of Lansing it arrives from the 5th to the 12th of May, rarely earlier or later. At Petersburg, Monroe county, Mr. Trombley's earliest record was May 6, 1887, and the latest May 20, 1890. It lingers until about the middle of September, but is rarely seen during the last week in that month.

On an average the first nest is built during the first week in June, and fresh eggs may be found from the 6th to the 20th of that month. A second nest is frequently built in July, often toward the last of the month, but these second nests are by no means as abundant as the first. The nest is unlike that of any other flycatcher of our acquaintance; shallow, thin-walled, often bottomless, or nearly so, yet so securely placed on a horizontal branch, and its materials so firmly interwoven and glued by spider's webs and apparently by some other adhesive material, that it frequently outlasts the winter's storms, though the birds seem never to use the nest a second time. It is built mainly of fine grasses, thin strips of bark, small roots and various plant fibres, and covered outside by spider's webs, bits of moss, lichens and similar material so as to closely resemble the branch upon which it is placed. Ordinarily it is not less than ten feet from the ground and occasionally is found at an elevation of forty or fifty feet, more often from twenty to thirty.

The eggs are usually three, occasionally but two, more rarely four. They are white or cream-colored, heavily spotted about the larger end with markings of brown and purple, and average .71 by .53 inches.

According to Bendire "the ordinary call note sounds like 'pee-a-wee' or 'see-e-wee,' long drawn out and plaintive in sound; apparently a short note like 'pee-eer,' 'phee-hee,' or 'hee-ee' is also given, this if possible is a still more mournful strain than the former, but it is not so frequently heard. No two persons would put them down alike." After sunset the Wood Pewee not infrequently breaks into a twittering song of considerable length and variety which it utters while on the wing and flying irregularly here and there as if in great excitement.

The food consists very largely of insects taken on the wing, yet it not infrequently hovers before a twig or leaf and snaps up small insects which appear to be stationary, sometimes descending to the grass for this purpose. Its food habits on the whole may be considered beneficial, though not markedly so. Three specimens, taken in an orchard in Illinois which was being destroyed by canker worms, were examined by Professor S. A. Forbes and found not to have eaten any of the caterpillars, the stomachs containing more than 50 per cent of flies and gnats, with various harmless beetles and a few ants with other hymenoptera. In Nebraska Professor Aughey found seven grasshoppers and many other insects in the single specimen which he examined.

TECHNICAL DESCRIPTION.

Adult: Dark olive above, darkest on top of head; under parts whitish, washed on sides and across breast with the color of the back, and sometimes tinged with yellow on the belly; wings brownish-black with two more or less distinct bars formed by the whitish tips of the greater and median coverts; tail plain brownish black; upper mandible dark brown, lower yellowish; feet black; iris brown. In general appearance much like the Olive-sided Flycatcher, but decidedly smaller, lacks the cottony flank tufts, and does not show the mottling due to dark-centered feathers.

Length 5.90 to 6.50 inches; wing 3 to 3.45; tail 2.50 to 2.90; culmen .43 to .52.

183. Yellow-bellied Flycatcher. Empidonax flaviventris (*Baird*). (463)

Synonyms: Tyrannula flaviventris, M. W. & S. F. Baird, 1843.—Muscicapa flaviventris, Aud., 1844.—Empidonax flaviventris, Baird, 1858, and most authors.

The only one of the small flycatchers which is distinctly yellow below in the spring; in the autumn it is not readily separated by this mark from several other species.

Distribution.—Eastern North America, west to the Plains, and from southern Labrador south through eastern Mexico to Panama, breeding from the northern states northward.

In Michigan this bird occurs sparingly during the migrations, passing northward during May, and southward during August and September. It is so seldom noticed that average dates of occurrence cannot be given. Swales calls it a common migrant at Detroit, giving May 7, June 9, August 12, and September 27 as extreme dates. While with us there seems to be nothing in its habits which serves to distinguish it particularly from the other species which it so much resembles. It is likely to be found in low growths and in moist woodlands, and feeds principally on insects caught on the wing.

Its nesting habits are peculiar, since, unlike any other native flycatcher, the nest is always placed on the ground. Usually a mossy knoll or fern-covered bank is selected and the nest is sunken to its edge and not infrequently roofed over and reached by a short passage from the outside. The nest consists largely of mosses, fern stems and slender roots, and the eggs, usually four, are white, finely marked with dots of brown, mainly about the larger end. They average .73 by .51 inches.

We have no record of a Michigan nest of this species, yet it is extremely probable that the bird breeds occasionally in the higher parts of the Lower Peninsula and throughout a considerable extent of the Upper Peninsula. It seems to be nowhere an abundant species and the scattered individuals seen in midsummer in these localities might easily breed without the nest being discovered. Mr. T. B. Wyman writes that it is a frequent summer resident at Negaunee, Marquette county, and breeds there. Max M. Peet records a pair seen in a tamarack swamp on Isle Royale, July 14, 1905, and the female taken. Also another pair found in a cedar swamp July 26 (Adams' Rep., Mich. Geol. Surv., 1908, 359).

TECHNICAL DESCRIPTION.

Adult: Upper parts dark olive green, top of head little if any darker; under parts mainly pale sulphur yellow, especially along the median line; sides of breast plain olive, this color sometimes extending entirely across the breast and along the sides; two yellowish white wing-bars formed by tips of greater and middle coverts; secondaries usually edged with yellowish; tail olive brown; upper mandible dark brown, lower pinkish or yellowish white; iris brown; feet black.

Young: Similar but duller, the wing-bands yellower.

Male: Length 5.10 to 5.80 inches; wing 2.55 to 2.75; tail 2.10 to 2.30; culmen .48 to .59.

Female: Wing 2.40 to 2.50 inches; tail 2 to 2.25.

184. Acadian Flycatcher. Empidonax virescens (*Vieillot*). **(465)**

Synonyms: Green-crested Flycatcher, Small Green-crested Flycatcher, Green Flycatcher.—Platyrhynchos virescens, Vieill. 1818.—Muscicapa querula, Wilson.—Tyrannula acadica, Bonap.—Empidonax acadicus, Baird, Coues, B. B. & R., Nehrling, Bendire, and others.—Empidonax virescens, A. O. U. Check-list, 1895.

Not to be separated from the Alder Flycatcher, or even with certainty from the Least and Yellow-bellied Flycatchers, except by the expert. Its note and its nest and eggs are alike distinctive, but the note is not easily described and the nest is seen much less often than the bird.

Distribution.—Eastern United States, north to southern New York and southern Michigan, west to the Plains, south to Cuba and Costa Rica. Rare or casual in southern New England.

Throughout the southern half of the Lower Peninsula this flycatcher is generally distributed and a rather common inhabitant of upland woods, particularly beech and maple. It is nowhere abundant, yet it is seldom that any beech and maple grove of a dozen acres does not contain one or more pairs of these birds. It seems to prefer the deep woods, and its favorite haunts are the more or less leafless spaces midway between the earth and the leafy crowns of the forest trees above. Here it sits, very much like the Wood Pewee, darting from its favorite perch on a dead limb to capture passing insects and at intervals uttering its sharp and characteristic note which Bendire describes as "resembling 'wick-up' or 'sick-up' interspersed now and then with a sharp 'queep-queep' or 'chier-queep,' the first syllable very quickly uttered."

The nest is peculiar, being frail, basket-like, yet shallow, and almost always partly pensile. It is slightly built of slender twigs, rootlets and grasses, often snugly fastened with cobwebs, and frequently decorated with catkins of various trees. It is placed invariably on a horizontal spray or drooping branch near the tip, most often on beech, maple or dogwood (*Cornus*), but also on witch-hazel, hickory, oak and other trees. It is seldom more than a dozen feet from the ground, often within reach of the hand, and the bottom usually so thin that the eggs can be seen through it. These are usually three, but may be either two or four. They are creamy or buffy white, marked with specks and spots of different shades of brown, mainly about the larger end. They average .71 by .53 inches.

This bird arrives from the south at about the same time as the Wood Pewee, and nests with eggs are found most often between June 1st and 12th.

The species has been reported from many points in the northern part of the state, and even from the Upper Peninsula, but we have seen no specimens collected north of 43½°, and believe that most, if not all, the reports from farther north are based on mistaken identification. According to Kumlien and Hollister (Birds of Wisconsin, p. 132), this species is not known to occur at all in Wisconsin.

TECHNICAL DESCRIPTION.

Adult: Upper parts uniform olive or olive green, the precise shade variable, but the head not darker than the back; wings olive, with two conspicuous buffy or yellowish bands, and secondaries edged with same shade; throat and middle of belly usually pure white, rarely tinged with yellow; breast and sides shaded with olive gray, the sides of the belly usually tinged with yellowish; tail plain olive; upper mandible dark brown, lower pale yellow or flesh-color; iris brown.

Length 5.50 to 5.90 inches; wing of male 2.75 to 3.10; tail 2.30 to 2.70.

Female: Wing 2.55 to 2.70 inches; tail 2.25 to 2.35.

185. Alder Flycatcher. Empidonax trailli alnorum (*Brewst.*) (466a)

Synonyms: Traill's Flycatcher (part).—E. trailli alnorum, Brewster, 1895, A. O. U. Check-list, 1895, and most recent authors.

Not separable from Traill's* or the Acadian Flycatcher except by the expert.

Distribution.—Eastern North America from the Maritime Provinces and New England westward at least to northern Michigan, etc., breeding from the southern edge of the Canadian Fauna northward; in winter south to Central America.

In Michigan the Alder Flycatcher appears to be generally distributed, although there is a possibility that some of the records from the southern part of the state may refer to the closely related Traill's Flycatcher.* It has been reported as more or less common in the following counties: Monroe, Kalamazoo, Wayne, Washtenaw, St. Clair, Ingham, Kent, Saginaw, Emmet, Mackinac, Marquette, Keweenaw and Ontonagon. It has not, been found breeding in all these places, but has been taken during the breeding season in almost all of them, and there can be little doubt that it nests wherever found between the middle of June and the middle of July. In addition to the places just mentioned specimens were killed on Spectacle Reef Light, in northern Lake Huron, and the writer found it on Beaver Island, Charlevoix county, Lake Michigan.

In Monroe county Mr. Trombley found it nesting abundantly and states that in 1879 he found at least twenty nests in one restricted locality, all in alders, willows or similar low growth in wet ground. No other writer appears to have found the species nesting so abundantly, yet according to Swales it is by no means uncommon in Wayne and St. Clair counties. Purdy states that it is abundant and nests along the margins of streams near Plymouth, Wayne county, and it has been found nesting commonly in Kalamazoo and Ingham counties.

In its nesting habits it differs markedly from all the other small flycatchers (except Traill's) in building a somewhat bulky, very compact, deeply hollowed nest, seldom at a height of more than six feet from the ground, often within two feet. These nests are almost invariably placed in upright forks of slender bushes and usually in very wet ground, not infrequently in standing water or at the very edges of streams. In this last respect it seems to differ from Traill's Flycatcher, since the latter seems to be more partial to higher ground, and nests more often in dry situations. The nest consists of various soft substances and commonly contains three white or cream-colored eggs, spotted, sometimes quite heavily, with brown. Occasionally four eggs are found. They average .73 by .53 inches.

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*For notes on Traill's Flycatcher see Appendix.

The bird arrives from the south from the middle to the last of May and the eggs are seldom laid before the first week in June, probably ten days later in the Upper Peninsula.

Considerable difference of opinion exists as to the note of this bird, but all observers agree that it is distinctly unlike that of any other Flycatcher. Brewster writes it "kée-wing;" Dwight gives "ee-zeé-e-up;" Mr. F. H. Allen states that Dwight's rendering seems to him nearly correct, but he prefers "wee-zee-up, the up very faint;" Dr. Morris Gibbs writes the call "pit-too." On the few occasions when we have heard the bird there has been a distinct nasal or metallic twang in the note which is not suggested by any of the previous renderings unless it be Brewster's "ké-wing."

All observers appear to agree that the bird is partial to wet situations and low growths, and is seldom found in the deep woods or the dryer groves and orchards.

TECHNICAL DESCRIPTION.

Adult: Upper parts clear olive or olive brown, darker on the head, where the feathers usually have blackish centers; throat, lower breast and middle of belly pure white; sides of belly and lower tail-coverts decidedly yellowish; breast olive gray, darkest on the sides, but distinct all the way across; two conspicuous wing-bars of grayish or buffy white, and the secondaries and tertiaries rather broadly edged with the same; upper mandible dark brown, lower mandible pale, but much darker than that of the Acadian or Yellow-bellied Flycatchers; iris brown.

A large male from Marquette county gives the following measurements: Length (fresh), 6.10 inches; wing 2.80; tail 2.50; culmen .46. A female taken at same place and time (June 10, 1894) gave: Length 5.80 inches; wing 2.60; tail 2.30; culmen .42.

According to Brewster this subspecies differs from the typical Traill's Flycatcher "in having the coloring of the upper parts richer and more olivaceous, the wing-bands yellower and hence more conspicuous, the bill decidedly smaller and the legs rather shorter" (Auk XII, 1895, 161).

186. Least Flycatcher. Empidonax minimus (*Baird*). (467)

Synonyms: Chebec, Sewick.—Tyrannula minima, Baird, 1843.—Empidonax minimus, Baird, 1858.—Muscicapa acadica, Nutt.

Figure 95.

So similar to the three preceding species as to be separated with difficulty, but the Least Flycatcher is smaller than any of the others and the wing bars are nearly pure white. Its note, well expressed by the common name "Chebec", with strong accent on the last syllable, is distinctive; it is also the only one of our flycatchers which lays unspotted eggs, the color being creamy white.

Distribution.—Chiefly eastern North America, west to eastern Colorado and central Montana, south in winter to Central America. Breeds from the northern states northward.

In Michigan the Least Flycatcher seems to be universally distributed, but nowhere very abundant. It is an inhabitant of the open woods, orchards and groves, and is not infrequently found in city parks and gardens. It is one of the later migrants in spring, rarely reaching us before the first of May, although Trombley recorded it at Petersburg on April 23, 1885, and April 29, 1892; in 1890, however, it did not appear until May 12, and in 1898 was first seen May 14. In the northern part of the state it is a week or ten days later.

It nests usually in deciduous trees and at all heights from ten to sixty feet from the ground, the nest being sometimes saddled on a branch of about its own diameter and at other times placed in an upright fork. It is small, compact, deeply hollowed, and very neatly built of soft fibrous materials, with a lining of cottony fibres and occasionally a few feathers. The eggs are white, usually with a distinct creamy or buffy tint, and almost always unspotted; occasionally eggs are seen with a few faint brown dots. They are commonly four, but may be three or five, and average .64 by .49 inches. The period of incubation is said to be twelve days.

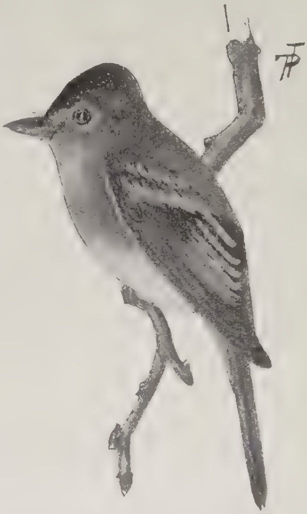

Fig. 95. Least Flycatcher. From original drawing by P. A. Taverner.

The food is mainly insects, though a few berries are eaten in the late summer. The bird is strongly beneficial to the farmer and fruit grower and should be rigidly protected.

TECHNICAL DESCRIPTION.

Very similar to the Alder Flycatcher, but besides being decidedly smaller the upper parts are olive-grey rather than olive-green or olive-brown, the two wing bars are decidedly whitish, or at most grayish-white, not yellowish, and there is a conspicuous whitish eye-ring; chin, throat and belly whitish, the throat sometimes nearly white, the belly usually faintly tinged with yellowish; breast and sides washed with ashy gray; upper mandible dark brown, the lower much lighter but not yellowish except perhaps at very base, in this resembling the Alder Flycatcher; iris brown.

Male: Length 4.90 to 5.50 inches; wing 2.30 to 2.60; tail 2.10 to 2.40.
Female: Wing 2.20 to 2.40 inches; tail 2.10 to 2.25.

Suborder OSCINES. Song Birds.

Family 52. ALAUDIDÆ. Larks.

This family is represented in Michigan only by the Horned Larks or Shore Larks, two or three species of which occur with more or less regularity in migration, but only one, the Prairie Horned Lark, nests. The old world Skylark (*Alauda arvensis*), famous for its beautiful song and lofty flight, is a member of this family, but has never been recorded from this state, though it was introduced in the vicinity of New York city fifty years ago and has become sparingly naturalized on Long Island.

187. Horned Lark. Otocoris alpestris alpestris (*Linn.*). (474)

Synonyms: Northern Horned Lark, Winter Horned Lark, Shore Lark.—Alauda alpestris, Linn, 1758.—Eremophila alpestris, Boie. Alauda cornuta, Wilson.—Eremophila cornuta, Boie, 1828, Coues, 1861.—Otocoris alpestris, A. O. U. Check-list, 1886, and most recent authors.

The little feather-tufts or "ears" which suggested the name "Horned Lark," and the very long, nearly straight claw on the hind toe, are distinctive of the Horned Larks; the present species may be separated from the Prairie Horned Lark by its larger size, the deeper yellow on the throat, and the yellow line over the eye, but the two forms are readily confounded by any but the expert.

Distribution.—Known to nest only along the coast of Labrador and northeastern America, probably west to Hudson's Bay; in winter south to the northern United States regularly, and occasionally as far as the Carolinas and the Ohio River. Its range as yet has not been satisfactorily separated from that of Hoyt's Horned Lark, but the latter is decidedly more western in its distribution.

The Horned Lark and the Prairie Horned Lark are so similar in general appearance, and have been so generally confounded by observers, that it is difficult to say how common this species really is in Michigan. Apparently it occasionally spends the winter in the state, mingling more or less with its near relatives, but withdrawing northward in the late winter or early spring, and returning southward again in autumn. Mr. Wilbur H. Grant observed a flock of 20 near Houghton, Houghton county, October 2, 1904, and took specimens, one of which is now in the University of Michigan collection (No. 31775) at Ann Arbor. Another specimen in the same collection (No. 30278) was taken by Dr. Morris Gibbs in Montcalm county, October 20, 1883. In the collection of the Kent Scientific Museum, Grand Rapids, there are skins of four males, all taken in Kent county, one by Stewart E. White, November 1, 1890, the other three, May 6, 1878, by C. W. Gunn. In the collection of Mr. Newell A. Eddy of Bay City, there is a fine specimen of a male taken at Bay Shore, Bay county, October 9, 1890, and identified by A. K. Fisher of Washington. Other specimens taken at the same time belong to the subspecies *praticola.* Mr. H. A. Purdy, of Plymouth, states that it is sometimes seen in winter, but that its place is quickly filled in spring by the Prairie Horned Lark. Mr. Swales, of Detroit, does not know of any record for southeastern Michigan. It was found in some numbers on Isle Royale, Lake Superior, in the autumn of 1905 by the University expedition, the first small flocks appearing as early as September 13, but increasing in size within a few days until single flocks contained 200 or 300. On the Charity Islands, at the mouth of Saginaw Bay, N. A. Wood found it fairly common in the fall of 1910, the first one appearing on September 18. A series of typical specimens was taken (Wilson Bulletin, XXIII, 1911, 98).

There is no reason to suppose that it ever nests within our limits. Its habits while with us in fall and winter are similar to those of the Prairie Horned Lark, with which it associates freely, yet flocks of the two species frequently keep distinct. Like the Prairie Horned Lark it nests on the ground, the nest being deeply sunken in the moss or herbage, and the eggs closely resembling those of the other subspecies. There were no eggs of this species in the United States National Museum in 1895, according to Captain Bendire, and so far as we know none have been taken since. Mr.

E. A. McIlheny took several nests with eggs in Labrador in 1894, but all his collections were lost by the foundering of the steamer Miranda in which he was returning from Greenland.

TECHNICAL DESCRIPTION.

Bill shorter than head, conical, acute, without trace of notch or hook; claw of hind toe straight and much elongated, as long as or longer than the toe itself; two conspicuous little feather-horns or ear-tufts at the side of the crown.

Adult male: Upper parts dark pinkish brown, brightest and clearest on the nape, shoulders, rump and upper tail-coverts, the back and scapulars more grayish and heavily streaked with brown; forehead, line over the eye, part of the auriculars, chin and throat, rather bright sulphur yellow; front of crown, ear-tufts, lores, line under eye, cheeks and a broad crescent on the chest, black; lower breast whitish, shaded at the sides with pinkish brown and usually more or less streaked with dusky; belly and under tail-coverts white; primaries brownish, darker at the tip; middle pair of tail-feathers grayish like the back, the others black, the outer vane of the outer pair edged with white; bill bluish black or horn color; iris brown.

Adult female: Similar, but smaller, grayer, duller and more streaked.

Male: Length 7.50 to 8 inches; wing 4.20 to 4.60; tail 2.70 to 3.10; culmen .40 to .50. Female: Length 6.75 to 7.25; wing 3.95 to 4.55; tail 2.50 to 3.10.

188. Prairie Horned Lark. Otocoris alpestris praticola *Henshaw.* (474b)

Synonyms: Lesser Horned Lark, Summer Horned Lark, Prairie Lark, Yellowthroat.—Otocoris alpestris praticola, A. O. U. Check-list, 1886, and all recent authors.

Figures 96 and 97.

For distinctive marks see notes under preceding species.

Distribution.—Upper Mississippi Valley and the region of the Great Lakes to New England, breeding eastward to northeastern New York and western Massachusetts, New Hampshire, and Vermont, and migrating south to South Carolina, Texas. etc.

The Prairie Horned Lark occasionally remains through the winter in southern Michigan, but ordinarily is entirely absent from the state during December and January, arriving from the south as soon as the snow begins to disappear, usually in February, sometimes not until the first of March. It is said to arrive in large flocks, but if so these soon break up and the birds are found singly, in pairs, or in small parties of three to ten. In the late fall it is sometimes seen in flocks of fifty or one hundred, and at that season probably associates with the northern species, *alpestris.* It is our earliest passerine bird to nest, and frequently eggs are found before the middle of March and while snow still covers most of the ground. The birds begin to sing or twitter immediately on their appearance, and if not already paired soon select mates and begin nesting. Probably two broods are reared always, and sometimes three, while a few observers claim that a fourth brood is sometimes raised. It seems likely that a large proportion of the earlier nests are covered by snow and abandoned, since young Horned Larks are rarely seen before May, and they are much more abundant in June and July. The writer found young just ready to fly at Gaylord,

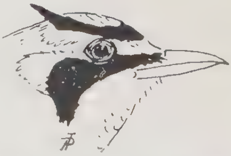

Fig. 96.
Head of Prairie Horned Lark.

Otsego county, June 6, 1902, and has inspected a nest found March 27, 1904, with two eggs, near the College in Ingham county, and another near the same place, with three eggs, March 13, 1906. Mr. Hazelwood, of Port Huron, states that he has taken the eggs in March, and Dr. Gibbs took them several times in April. Mr. L. Whitney Watkins took a set at Manchester, Jackson county, March 20, 1889, and L. J. Cole records a nest with four eggs taken at Grand Rapids, March 27, 1896. Mr. Swales found a set of eggs, June 19, 1895, in southeastern Michigan.

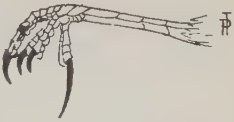

Fig. 97.
Foot of Prairie Horned Lark.

Mr. S. E. White states that this species is very common at Mackinac Island about the middle of September, and that the Indians shoot them for food under the name of "Yellow-throat." It has been generally supposed that this bird was extending its range toward the east; that formerly it was restricted to the Mississippi Valley, but that since 1860 it had overspread the eastern states, even reaching eastern Massachusetts in 1903. It seems doubtful whether this is really the case. It is conceivable that the species has always occurred in small numbers throughout the northeastern states, but that it has passed unnoticed until recent years, when the increase in the number of collectors and the more general publication of field notes have called attention to its presence.

The nest is always placed on the ground, in a hollow scooped out by the birds, and consists of grasses and vegetable fibres carefully interwoven and sometimes quite thick and warm. The eggs are from three to five, varying from olive to dirty white, thickly and finely speckled with brown. They average .85 by .62 inches.

The food of this bird is of much interest, since it has been accused of injuring grain crops, both by pulling the sprouting seed and by consuming the ripened grain. Thus far we have no evidence whatever in support of these charges, and the examination of a large number of stomachs shows that the Horned Larks are decidedly beneficial to the farmer, through the consumption of such weed seeds as pigweed, bitterweed. amaranth and sorrel, which they eat at all seasons of the year, while some good is done also by the eating of insects, although the bird is essentially a seedeater and the average amount of insects and spiders eaten during the year falls a little below ten percent (Barrows, U. S. Dept. Agr. Rep., 1892, p. 197). Le Baron, in 1870, recorded the fact that the Prairie Horned Lark ate cutworms as well as grain, and Professor Aughey shot one in Nebraska, June 16, 1875, whose stomach contained 33 small seeds and 42 locusts. We may safely say, therefore, that the species is mainly granivorous, but that insects are eaten more or less at all times, and, other things being equal, a larger proportion of insect food is taken when it is most abundant. Nestlings appear to be fed largely on insects even at a time when such food must be obtained with some difficulty.

TECHNICAL DESCRIPTION.

Bill, hind toe and claw, ear-tufts and general pattern of coloration precisely as in the typical Horned Lark just described, and with which the present subspecies intergrades. The main differences are as follows: The prairie form is decidedly smaller on the average, and the upper surface somewhat paler; practically no yellow markings anywhere except on throat, which is sometimes decidedly yellowish and sometimes almost white, with just a perceptible tinge of yellow; forehead and line over eye grayish white to pure white, usually without any yellowish tinge, while the auriculars are grayish white also. The same general differences are found between male and female as in the typical *alpestris*. Young: Birds just out of the nest lack the ear-tufts, but show the long hind claw; upper parts light grayish brown, mottled with blackish, the head and neck thickly sprinkled with small white spots, and most of the wing-feathers and coverts with white edgings and narrow black sub-marginal lines; under parts mainly whitish, the breast with numerous dusky spots or streaks, but with little or no sign of the black crescent.

Male: Length 7 to 7.50 inches; wing 4 to 4.30; tail 2.90 to 3.10. Female: Length 6.75 to 6.85 inches; wing 3.70 to 4; tail 2.60 to 2.90.

189. Hoyt's Horned Lark. Otocoris alpestris hoyti *Bishop.* (474k)

Synonyms: Otocorys alpestis hoyti, Bishop, 1896, A. O. U. Committee, 1903, and more recent authors.

Similar to the northern Horned Lark, *alpestris*, but the upper parts paler and grayer, the posterior auriculars gray rather than brown, and more of the yellow of the head and neck replaced by white.

Distribution.—In summer, British America from the west shore of Hudson Bay to the valley of the Mackenzie River, north to the Arctic Coast, south to Lake Athabasca; in winter southward to Nevada, Utah, Kansas and Michigan, casually to Ohio and New York.

This new subspecies of Horned Lark was described by Dr. Bishop in 1896 and is included in the list of Michigan birds on the strength of a single specimen, taken at Grand Rapids (Oberholzer, Proc. U. S. Nat. Mus. 24, 812), and two specimens taken in Montmorency county, in the fall of 1908, and now in the collection of P. A. Taverner, Ottawa, Can. The latter skins have been compared with authentic specimens of typical *alpestris* and *hoyti* in the collection of J. H. Fleming of Toronto, and there can be little question as to identity.

So far as known this form does not differ in habits from typical *alpestris*, from which it can be discriminated only by the expert, and with which it doubtless associates in winter. The technical description which follows may give some idea of the bird, but suspected specimens should be submitted to some competent ornithologist for critical comparison before their capture is published. It seems likely that this subspecies occurs as a straggler in Michigan at the same time as the northern Horned Lark, *alpestris*, but even this fact is not actually known.

TECHNICAL DESCRIPTION.

"Similar to *Otocoris a. alpestris,* but with the upper parts generally paler and more gray, the posterior auriculars gray rather than brown, and the yellow of the head and neck replaced by white, except the forehead, which is dirty yellowish white, and the throat, which is distinctly yellow, most pronounced toward the center. Adult male: Length 7.35 inches; wing, 4.54; tail, 3.01; bill from nostril, .41; tarsus, .89. The adult female in spring plumage differs in a similar manner from the female of *alpestris*, but in the female of *hoyti* the yellow on the throat is much paler than in the male" (L. B. Bishop, Auk, XIII, 1896, p. 130).

Family 53. CORVIDÆ. Crows, Jays, etc.

KEY TO SPECIES.

A. Large birds, wing 12 inches or more, plumage all black. B, BB.
  B. Wing more than 15 inches, tail graduated. Northern Raven. No. 193.
  BB. Wing less than 15 inches, tail-feathers all of same length. Crow. No. 194.
AA. Smaller birds, wing less than 10 inches, plumage not all black. C, CC.
  C. Tail very long (over 9 inches) and much graduated, the lateral feathers scarcely one-half the length of the middle ones. Magpie. No. 190.
  CC. Tail moderate (about 6 inches), somewhat rounded at tip. D, DD.
    D. Head with conspicuous crest, plumage largely blue. Blue Jay. No. 191.
    DD. Head without crest, plumage mostly gray, no blue. Canada Jay. No. 192.

190. Magpie. Pica pica hudsonia (*Sabine*). (475)

Synonyms: American Magpie, Black-billed Magpie.—Corvus hudsonius, Sabine, 1823.—Corvus pica, Forst., 1772.—Pica hudsonica, Bonap., 1838.—Pica melanoleuca var. hudsonica, Coues, 1872.—Pica caudata var. hudsonica, Allen, 1872.

A strikingly handsome bird, averaging about 18 inches in length, of which the tail forms nearly half; general color glossy blue-black with purple and metallic reflections, but the entire belly and large areas on the wing-feathers and scapulars pure white. The bird suggests a Crow Blackbird or Grackle, but is larger than our species, and the conspicuous white markings of course distinguish it at a glance.

Distribution.—Northern and western North America, from the Plains to the Cascade Mountains and north to Alaska; casually east and south to Michigan (accidental in northern Illinois in winter), and in the Rocky Mountains to New Mexico and Arizona.

This species is mentioned in several of the older lists of birds of the state and there can be little doubt that it is, or formerly was, found occasionally in winter in the northern parts of the state, particularly in the Upper Peninsula. Schoolcraft wrote: "The Magpie is found to approach as far north as Lac du Flambeau on the head waters of the above river [Montreal River, which forms the boundary between Michigan and Wisconsin], and in the vicinity of Lake Superior this bird is called by the Chippewas 'Wobish Kakagee' or 'White Crow'" (Schoolcraft, Discovery of the Sources of the Mississippi River, "Birds of Lake Superior," 1855, page 104). Dr. S. Kneeland, Jr., in his Birds of Keweenaw Point (Boston Soc. of Nat. Hist. VI, 231) states that he has seen a few specimens obtained near Eagle River (Keweenaw county). This was in the winter of 1856-57. Dr. Gibbs states that the Rev. Mr. Day of Cadillac, who formerly lived as a missionary at an Indian reservation in the Upper Peninsula, told him that he knew of this species as a very common one at that time "ten to twenty years ago." The bird is also included by G. A. Stockwell in his list of Michigan birds (Forest and Stream, Vol. 8, 19, 300). McIlwraith, in his "Birds of Ontario," states that Mr. C. J. Bampton, Registrar of the District of Algoma, reports it as a rare winter visitor at Sault Ste. Marie (Ontario), this of course is just across the St. Mary's River from Sault Ste. Marie, Mich. It has also been reported at Odessa, Ont. March 12, 1898.

In recent years apparently none have been seen within our limits. There are two Magpies (Nos. 20000 and 20001) in the Kent Scientific Museum, marked "Michigan, Gunn Collection, C. W. Gunn," but without other data. The bills of both, however, are nearly pure white, and the birds are doubtless the Yellow-billed Magpie, from California. Kumlien and Hollister (Birds of Wisconsin, p. 84) give several records for Wisconsin, but none of recent date. Mr. H. N. Clark of Meridian, is said to have captured one in a trap in Dunn county, Wis., in 1870, and to have seen another in February, 1884. According to Dr. Hoy one was obtained at Bagley's Harbor, Wisconsin, on Lake Michigan, November 15, 1849.

This bird is very closely related to the European Magpie, so closely in fact that it is almost or quite impossible to separate the two birds. In its northwestern home it is said to nest in thickets or dense trees, building an immense nest of sticks, twigs and similar material, in the midst of which a hollow is left for the eggs, this being reached by a covered opening or burrow sometimes of considerable length. The eggs vary in number from six to ten, are drab or greenish, heavily spotted with brown and purplish, and average 1.30 by .91 inches.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Head, neck, breast and entire upper parts (except scapulars) deep black, the top of head usually with a metallic gloss, and the feathers of the throat largely white below the surface; belly, sides and flanks pure white; thighs black; upper surface of wings mainly black, with green, blue, or violet reflections, the inner webs of the primaries largely white; scapulars pure white; tail metallic greenish-black with purplish and bronzy reflections toward the tip, much graduated, the lateral feathers only about half as long as the middle pair; bill, legs and feet black; iris bluish gray; naked skin about the eyes blackish.

Young: Similar to adult, but without metallic reflections except on wings and tail; the head, neck, and back dull black.

Length 17.40 to 21.75 inches; wing 7.30 to 8.40; tail 9.30 to 11.95; culmen 1.15 to 1.42.

191. Blue Jay. Cyanocitta cristata cristata (*Linn.*). (477)

Synonyms: Jay, Common Jay.—Corvus cristatus, Linn. 1758.—Garrulus cristatus, Vieill.—Cyanurus cristatus, Swains.—Cyanocorax cristatus, Bon.

Figure 98.

Recognizable at a glance by the general bright blue color checked with black and white, and the conspicuous crest. It can be mistaken for no other bird, except possibly for the Kingfisher, and its habits sufficiently distinguish it from that species.

Distribution.—Eastern North America to the Plains, and from the Fur Countries to Florida and eastern Texas.

The Blue Jay is found abundantly throughout Michigan and is commonly believed to be resident wherever found. Certain it is that Blue Jays occur

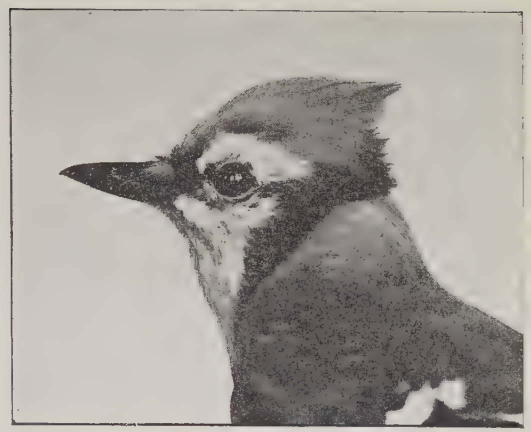

Fig. 98. Blue Jay.
Photograph from mounted specimen.
(Original.)

in every part of the state during winter as well as summer, yet in many sections there is a well marked migration, thousands passing southward in September and October and northward again in May. At Port Huron Mr. Hazelwood states that a large flight starts about May first and lasts all through the month, thousands passing north. It is possible that the individuals which remain with us through winter have come from places farther north and that the birds which nest in any one locality move farther south in winter. They frequent all kinds of timber and seem to have a special liking for orchards and the vicinity of towns and villages. In this respect they differ widely from the Blue Jays of the eastern states, which avoid populous districts and are inclined to be shy and retiring.

On the College campus the Blue Jay is one of our most familiar birds. The nest is placed in apple trees, shade trees, either deciduous or evergreen, often within reach of the hand; the birds show almost no fear of human beings, and in defense of their nests will often strike a person on the head or even swoop down and peck a cat or dog. During winter they live largely upon scraps furnished by the residents, but whenever the snow is not too deep they hunt for acorns and other hidden stores which are buried in the ground.

Nesting may begin very early, but eggs are rarely laid before the first of May. We have repeatedly seen birds repairing old nests and starting new ones in March, and on one occasion a pair worked several days on a nest in the middle of February, but we have never seen young out of the nest before June first, and although but one brood seems to be reared, we have occasionally seen young unable to fly during the first week in July, Old birds feeding four young just out of the nest were found on July 15, 1903. On July 31, 1907, we examined a nest near the College which contained a single egg and two young, possibly three or four days old. This of course was a second brood. On the same day an adult Jay was seen feeding a full grown young one which was following her about and clamoring for more; and even on August 18, 1907, old Jays were seen feeding full grown young.

Among eight nests containing fresh eggs, found in Kalamazoo county by the late Dr. Westnedge, the earliest was found May 5, 1888, and the latest May 31, 1886. The greater number of nests were found between May 10 and 25. The eggs vary greatly in color, the ground color being pea-green, olive-green, buff, and even cream-color, more or less heavily spotted with brown and lavender of various shades. They average about 1.10 by .81 inches.

The food of the Jays includes almost everything eatable, but they show special fondness for acorns, beech nuts, small fruits and insects. They rob the nests of smaller birds frequently, yet so far as our personal observation goes such robberies are restricted to particular birds and are by no means general. With at least half a dozen Blue Jays' nests under observation each year we have known an entire season to pass without the detection of a single act of violence on the part of the Jays. On the other hand, we have occasionally known several nests of Robins and Chipping Sparrows to be destroyed within a week.

The Blue Jay is a rather general feeder on insects and probably does a large amount of good in this way, especially since it does not disdain hairy caterpillars but appears to eat them with some pleasure. Probably the greatest good done is in eating caterpillars and grasshoppers, but it may be useful also in consuming the bark-boring and wood-boring beetles and other large insects infesting woodlands. It gets a large part of its food from the ground and also buries or hides there any surplus that it may have. This is particularly true of small fruits, acorns, beechnuts and grain, although it also stores these things away in knot-holes, crevices in trees, and chinks behind loose sheets of bark.

Undoubtedly the Blue Jay is an important factor in reforesting burnt or cut-over lands, since it is continually planting acorns, nuts and seeds of various kinds. Of course it also distributes the seeds of many of the fruits which it eats, as these are disgorged or pass through the intestines and are distributed under favorable conditions for growth. Mr. Amos Butler, of Indiana, believes that the Blue Jay distributes seeds of poison ivy extensively in this way, but our own investigations indicate that it eats few if any poison ivy berries, and the distribution of these seeds is largely accomplished by other birds. Professor F. E. L. Beal, of the U. S. Department of Agriculture, found no seeds of poison Rhus in the 292 Blue Jay stomachs which he examined. He says "Jays do not eat the seeds of the poison ivy (*Rhus radicans*) or poison sumac (*Rhus vernix*). It is worthy of notice that the sumac seeds eaten are those of the harmless staghorn (*Rhus hirta*) and smooth sumac (*Rhus glabra*)" (Yearbook U. S. Dept. Agr., 1896, 205).

Under some circumstances the Blue Jay becomes very annoying in its injury to cultivated fruits. It frequently attacks ripening apples and pears, pecking holes in the sides of the largest and ripest fruits and injuring a much greater number than it can possibly use. Moreover, its example is quickly followed by other birds, who begin by enlarging the openings made by the Jay, but probably attack sound fruits after a taste has been obtained. When work on a tree of early apples has been once started the Jays, Red-headed Woodpeckers, Robins and Orioles sometimes destroy almost every apple.

The Blue Jay has an immense variety of call-notes, many of which are decidedly musical, especially when heard at a little distance. Its ordinary harsh scream of "jay, jay" has given it its common name, but it has in addition a common yodling note which Seton Thompson writes "sir-roo-tle, sir-roo-tle, sir-roo-tle," which he says is uttered in a subdued undertone; the same syllables, however, express very well one of its common calls in autumn which may be heard at a distance of a quarter of a mile or even more. It also imitates the calls of the Red-tailed and Red-shouldered Hawks with such precision and accuracy as to mislead many birds and even deceive the practiced human ear. During quiet days in winter, and especially late in winter and in earliest spring, the Blue Jay frequently utters a subdued and somewhat varied warble which is decidedly musical. More than once we have been on the point of passing a tree from which this sound issued under the belief that the author was a Pine Grosbeak, but after seeing the performer in the act we were able to note a decided difference in the songs of the two birds. Dr. Morris Gibbs has called our attention to the same song, and it has been reported by others. The bird is something of a ventriloquist and we believe it possesses considerable power of mimicry. Taken altogether, it is a bird of such strong character, and with so many good points, that in spite of its occasional forays on the eggs and young of other birds we should sorely miss it if exterminated. The present law, which places the Blue Jay among protected birds, is on the whole a wise one.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Forehead, spot in front of eye, crescent on chest continued into collar encircling the neck, deep black; top of head, including conspicuous crest, back, scapulars, rump and upper tail-coverts, bright blue without spots; upper surface of wings bright blue, the secondaries, tertiaries and coverts narrowly barred with black, the greater coverts, secondaries and tertiaries broadly tipped with pure white; tail-feathers blue, barred narrowly with black, all except the middle pair with deep white tips; throat grayish white, with a purplish tinge; breast and sides dusky gray; belly and under tail-coverts pure white; bill and feet black; iris dark brown.

Young: Similar, but duller, the crest shorter and markings less sharply defined.

Length 11 to 12.50 inches; wing 5 to 5.70; tail 5.05 to 5.70; culmen .93 to 1.06.

192. Canada Jay. Perisoreus canadensis canadensis (*Linn.*). **(484)**

Synonyms: Whiskey-jack, Whiskey-john, Moose Bird, Meat Bird, Grease Bird, Venison Bird, Camp Robber, Meat Hawk.—Corvus canadensis, Linn., 1766.—Garrulus canadensis, Nutt., Aud.—Garrulus fuscus, Vieill.

Size of the Robin, dark gray above, lighter gray below, bleaching into whitish on forehead and crown and becoming almost black on the back of the head and neck.

Distribution.—Northern New York, Northern New England, and Northern Michigan northward to Arctic America.

A bird well known to deer hunters throughout the northern half of the Lower Peninsula, and in most of the Upper Peninsula, since it hangs about their camps, picking up refuse scraps thrown out by the cook and pecking at meat or game hung up outside. It often becomes perfectly fearless under such circumstances and is sometimes a great nuisance. Ordinarily, however, it is shy and not often seen, although its voice may be constantly heard both summer and winter. Probably it is resident over most of the territory where it is found, but it may be driven somewhat farther south in winter, and there are records of several southward movements of considerable magnitude; the last of these, in the fall of 1904, extended southward in Ontario almost or quite to the city of Toronto.

In Michigan the bird is rarely if ever seen south of the Saginaw-Grand Valley and must be considered decidedly rare except in the higher and more densely wooded regions of the northern half of the Lower Peninsula. Professor Cook's statement that this species was seen in winter of 1893 on the campus of the Agricultural College (Birds of Mich., 2d ed., 1893, p. 100) is doubtless a mistake, since neither Professor Cook himself nor any of his assistants has any recollection of the fact, and no one else has ever observed the bird here. It is not improbable that before the pine forests were cut off this species may have been a winter visitor as far south as Shiawassee county at least, and possibly much farther south along the Lake Michigan shore. The most southern record which we can find is the statement by Mr. Newell A. Eddy that he found it common on the south branch of the Pine River, north of Bay City, in November, 1879.

It is common in suitable places throughout the Upper Peninsula and has been recorded repeatedly from Wexford, Missaukee, Roscommon, Ogemaw, Crawford, Oscoda and Alpena counties in the Lower Peninsula. We have a skin in the College collection taken in Alpena county, November 22, 1898, by A. B. Durfee, and two skins of young birds, still in immature plumage, taken near Iron Mountain, Dickinson county, May 20, 1894, by Mr. E. E. Brewster. This may be considered pretty good proof that the bird nested in that county, for it is not likely that these birds would have wandered south during the spring. Mr. O. B. Warren states that the species is common and nests in Marquette county, but we have been unable to obtain a single nesting record for the state. The interesting account given by Mr. O. B. Warren (Auk, XVI, 1899, pp. 12-19), with excellent photographs of nest and young, relates to Mahoning, Minnesota, not Michigan, although the statement occurs in the article that the observations were made at "Mahoning, Mich." This nest was built between February 22 and March 12, 1898, and confirms the statement made by various other authors that nesting is always very early in the season, the eggs being laid almost invariably in March.

According to Captain Bendire the eggs are usually three or four, although five are sometimes found. Their ground color is gray, flecked and spotted over the entire surface with various shades of brown and lavender. They average 1.16 by .82 inches.

The Canada Jay is said to be fully as destructive to the eggs and young of wild birds as his near relative the Blue Jay, but we have no data tending either to confirm or disprove these statements. In Michigan the bird has been but rarely noted in summer, and so far as we know there have been no observations made on its summer food.

Dr. Kneeland, in his Birds of Keweenaw Point (1859) says: "This bird is common in winter, and a great pest to the trappers, from its propensity to steal their poisoned baits. Like the Raven it often falls a victim to its greediness, by devouring meat containing strychnine set for foxes and the fur-bearing animals."

According to Seton Thompson "Many of its notes resemble those of the Blue Jay, but it has a number distinctly its own. Some of these are musical, but most of them are harsh and discordant."

TECHNICAL DESCRIPTION.

Adult (sexes alike): No crest; forehead and anterior part of crown white or grayish white, the nasal tufts usually buffy or rusty; crown, occiput and nape brownish black to sooty black, bordered behind by a broad grayish white or ashy collar; rest of upper surface brownish or slaty-gray, the wing and tail feathers tipped with whitish; cheeks, chin, throat and chest white or grayish-white; rest of under parts plain gray, very variable in shade, but always darker than the chest; bill and feet black; iris brown.

Young: Nearly uniform slate-gray, as they leave the nest, with whitish tips on wing and tail feathers, but no trace of white forehead or throat; later the forehead becomes much lighter than the occiput, but the full plumage is not assumed until the following spring.

Length 11 to 12.10 inches; wing 5.60 to 5,90; tail 5,65 to 6.35; culmen .95 to 1.08.

193. Northern Raven. Corvus corax principalis *Ridgw.* (486a)

Synonyms: Raven, Common Raven.—Corvus corax, Wils., Nutt.—Corvus carnivorus, Baird, 1858, Coues, 1861, etc.—Corvus corax principalis, Ridgw., 1887, A. O. U. Committee, 1889.

Figure 99.

Known at a glance by its strong resemblance to the common Crow, from which it is readily separated by its much greater size, the lance-shaped separate feathers of the throat and neck (Fig. 99) and the graduated tail.

Distribution.—Northern North America, south to British Columbia, northern Michigan, New Brunswick, Maine, New Jersey, North Carolina, etc.

During the early history of Michigan the Raven was an abundant bird, and even forty years ago it was fully as abundant about Lansing as was the common Crow. At the present time it is confined almost entirely to the northern part of the Lower Peninsula and the more heavily wooded portions of the Upper Peninsula, and even there it is by no means abundant. Stragglers may wander south in winter and it would not be surprising if an occasional individual were to be found in winter at any point in the state; nevertheless the Raven must be considered a vanishing bird and its extinction doubtless will be complete within a very few years.

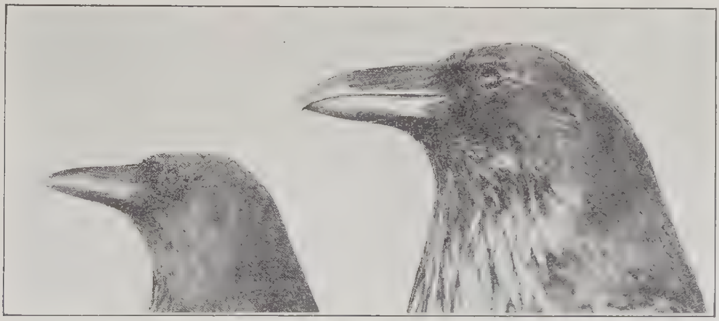

Fig. 99. Heads of Crow and Raven (at right) to show relative size. Photograph from mounted specimens. (Original.)

According to B. H. Swales it was formerly common in Wayne county, but is now probably extinct; the latest record for that vicinity being a pair seen by Mr. J. Claire Wood in 1885, not far from Windsor, Ont., just across the river from Detroit. McIlwraith, in his Birds of Ontario, states that he had a specimen in his collection which was obtained at St. Clair Flats, where it was said to be an occasional visitor in the fall. That, however, was previous to 1894. In 1879, according to A. W. Brayton, it was not uncommon along the shores of Lake Michigan from October until spring, eating the dead fish thrown up by the Lake (Trans. Ind. Hort. Soc., 1879, p. 129). Jerome Trombley states that it was common at Petersburg, Monroe county, when he was a boy, but is now entirely extinct. Mr. John Hazelwood of Port Huron writes that formerly he shot a good many near that place, but of late years never sees them. Dr. Gibbs states that he saw two in Lake county, October 12, 1883, and S. E. White records one as seen at Grand Rapids, April 8, 1890. We have a specimen in the College Museum taken November 12, 1896, near Trout Lake, Mackinac county, Mich., and Mr. C. J. Scranton of West Branch, Ogemaw county, told the writer in 1899 that, although not common there, several were seen every winter and that they usually stayed through the summer. The same year Mr. Oscar Palmer of Grayling, Crawford county, assured us that it was not uncommon in that vicinity still. Major Boies found it rather common in the fall on Neebish Island in the St. Mary's River, and O. B. Warren stated in 1898 that Ravens were seen every month of the year at Marquette, although they were rare. From 1889 to 1891 S. E. White found it common along the north shore of the Straits of Mackinac, and Mr. Newell A. Eddy of Bay City tells us that his last record for the Lower Peninsula is a pair seen at a lumber camp in Roscommon county, March 27, 1891. Judge J. H. Steere informed us in 1903 that the Raven was still very common at Sault Ste. Marie during some winters, often coming into the city after refuse. He stated that scores were killed in Chippewa county each winter by poison put out for wolves. Mr. Joplin of Munising informs us that it occurs regularly in winter on Grand Island (in Lake Superior), Alger county. Professor Eliot Blackwilder states that in Iron county (Upper Peninsula), it is a bird of the deep recesses of the forest, not common anywhere, but single pairs seen at frequent intervals (Auk, XXVI, 1909, 368).

Formerly the Raven doubtless nested all over the state and it is not impossible that it still nests in suitable places here and there. According to Hon. Chase S. Osborn it breeds in the Upper Peninsula "in the tallest dense-topped conifers," and by the middle or latter part of April deposits from two to seven eggs, which are hatched after about twenty days. Under date of December 22, 1906, Mr. Osborn wrote: "During the last month I have seen quite a number of Ravens in this vicinity (near Eckerman, Chippewa county), and upon one day I saw twenty-two, seven of them in one flight, but they are not as numerous as in former years."

The only account which we have been able to get of the actual finding of a Raven's nest in the Lower Peninsula comes from Mr. F. H. Chapin, of Kalamazoo, and refers to a part of the state in which this bird would hardly be looked for under present conditions. Mr. Chapin writes: "In May, 1880, there was a large swamp, several miles long and two miles wide, at the headwaters of the north fork of the Paw Paw River, in Almena township, Van Buren county. Here, breeding for the most part in large sycamores, was a large colony of Great Blue Herons, Mr. Sykes and myself went up there to get some herons and I immediately remarked a pair of Ravens. I was unable to visit the place again, however, until April 26, 1889, when I returned to the heronry with Mr. L. E. Reed, a student at that time in Kalamazoo College. The herons were not there, but we noted a pair of Ravens and after some search we saw a bird leave a large nest. We secured this bird and also another which had appeared on the nest. Both proved to be full grown young of the year, and I have one of them still in my collection. We did not get the old birds, for they were too wary. The nest was situated on the broken top of a sycamore, sixty feet up. The top had been blown off squarely and on this break a very large nest of sticks had been built. March 18, 1890, Mr. Reed and myself again visited the place, hoping to secure the old Ravens and the eggs, but were disappointed in both respects. The old birds kept out of range and the nest contained young too small to be of any use as specimens, so they were not molested. They were very noisy, and about two weeks old. February 15, 1891, Mr. Reed, Mr. R. F. Judson and myself again visited the swamp, but did not see or hear a Raven. March 6, 1892, Mr. Judson and myself again went to Almena and saw one Raven, but found no nest; this was my last visit to the place."

Max M. Peet, who accompanied the University of Michigan expedition to Isle Royale, Lake Superior, in the summer of 1905, gives the following interesting account of the habits of the Raven at that place: "The Northern Raven was nowhere common but seemed to occur in limited numbers all over the island. Three were seen in a cedar swamp on July 29, and a skeleton was found previous to this on the rocks near the lighthouse. They were occasionally seen at Siskowit during August, usually flying overhead or at some natural clearing near the beach. At Washington Harbor they were only visitors, coming every now and then to the clearings where they fed on grasshoppers which were so abundant. They were very wary. While exploring the ruins of the deserted town near the head of Siskowit Bay, on September 10, a nest of the Northern Raven was found in the old stamp mill. It was placed in the small hollow formerly occupied by the metal plate upon which the head of the stamp fell. The side walls of the stamp mill are broken down in places so that the entrance to the interior was simple. The nest was about four feet square and the deepest part about a foot deep, and was composed of sticks varying in size from a quarter inch to three-quarters in diameter, and a foot to three feet long. Several tail-feathers of the Raven were found in different layers of the nest, showing that in all probability the mass was the accumulation of several years of nest-building and repairing. Smaller feathers were scattered about the nest and floor. The lining consisted of small sticks and roots loosely laid together, but forming quite a compact mass in connection with the other material. The floor of the building was strewn with pellets consisting principally of fishbones, skeletons of small mice, and some insect remains. Under some of the rafters this had accumulated to such an extent that the deposit was four or five inches in depth. In places it was weathered so badly that it appeared simply as a mass of brownish earth" (Adams' Rep., Mich. Geol. Surv., 1908, pp. 361-362).

In other parts of the country the Raven frequently nests on cliffs and ledges of rock, but where such locations are not to be had it contents itself with tall trees, in which it builds a bulky nest, similar to that of the Crow, and usually rears its young in safety. According to Bendire the number of eggs varies from five to seven, sets of five and six being most common. The eggs have a ground color of pale pea-green, drab, or greenish-olive, and are unusually thickly and heavily spotted with different shades of brown, lavender and drab. The average size is 1.95 by 1.36 inches.

Probably the food of the Raven is almost as varied as that of the Crow, yet it is not known to attack cultivated crops of any kind, and the belief that it is destructive to young birds, eggs and game is rather an inference than the result of observation. At all events its scarcity at the present time precludes the possibility of its doing serious injury of this kind anywhere. Possibly it may hang about the nesting places of the gulls and terns in our northern waters, and do some mischief by robbing nests, but no actual observations of such piracy have come to our knowledge.

The ordinary call note, according to Bendire, is "craack-craak" varied sometimes by a deep grunting "koerr-koerr," and again by a "clucking, a sort of self-satisfied sound, difficult to reproduce on paper; in fact, they utter a variety of notes when at ease and undisturbed, among others a metallic-sounding 'klunk' which seems to cost them considerable effort."

TECHNICAL DESCRIPTION.

Feathers of the throat lanceolate and the tips distinct from each other, like the hackles of a rooster; tail much graduated, the lateral feathers two inches or more shorter than the middle ones; entire plumage dark black, with bluish, greenish and purplish reflections; bill, legs and feet black; iris dark brown. The female averages a little smaller than the male, and the full grown young are hardly different.

Length 22 to 26.50 inches; wing 16.50 to 18; tail 9.20 to 10.50; culmen 2.65 to 3.45.

194. Crow. Corvus brachyrhynchos brachyrhynchos *Brehm.* (488)

Synonyms: Common Crow, American Crow, Carrion Crow.—Corvus corone, Wils., Bonap., Nutt.—Corvus americanus, Aud. and most American authors.—Corvus frugivorus, Ridgw. 1881, Coues, 1875, and some others.—Corvus brachyrhynchos, Brehm, 1822.

Figure 99.

Entirely black, including bill and feet; length about 18 inches; feathers of throat with normal blended tips. Much larger than the Crow Blackbird and much smaller than the Raven; otherwise easily separable from both by the simply rounded, not pointed, tail.

Distribution.—North America, from the Fur Countries to the southern border of the United States. Locally distributed in the west.

In Michigan the Crow is an abundant bird during the larger part of the year and probably a few hardy individuals remain in all parts of the state even during severe winters. By far the greater number, however, withdraw from the state before the first of November, passing southward in large flocks and wintering, as is well known, in immense numbers throughout a belt of country less than two hundred miles in width, extending from Chesapeake Bay westward to Missouri and Kansas. Within this belt there are numerous "Crow-roosts" at each of which several hundred thousand Crows congregate each night to roost after foraging the surrounding country over an area often fifty miles in diameter during the day.

Crows begin to reenter the state from the south in February, sometimes as early as the middle of the month, but more often toward the close, and during March most of the Crows which nest in Michigan reach the locations selected for that purpose. Crows which proceed beyond our northern limits to nest continue to pass through the state until late in April or even the first week in May, at which time many of our local Crows already have young in their nests.

In the southern part of the state nest-building begins early in April, while along the northern border this may be postponed until the first of May. The nest is always bulky and consists largely of sticks, twigs, grasses, roots and similar fibrous material, to which sometimes masses of sod or even mud may be added. The nest is usually placed at a considerable height above the ground, and in regions where evergreens are plentiful these are most often selected. The eggs are commonly five or six in number, but may range from four to eight. They vary interminably in color and markings, but usually have a bluish or greenish white ground color heavily spotted and blotched with different shades of brown. They average 1.69 by 1.17 inches.

The Crow is proverbially shrewd and shy and doubtless succeeds in rearing its young in safety in the great majority of cases. In the latitude of Lansing the young leave the nest by the middle of June, and there is no reason to suppose that more than one brood is reared in the season.

The economic status of the Crow has been in dispute for more than a hundred years, and in spite of all the work which has been done in the attempt to settle the question, not a few points still remain obscure. Between the years 1886 and 1894 the author made a continuous and minute study of the food of Crows, based primarily upon the examination of more than 900 stomachs brought together at the Department of Agriculture in Washington, and this work has been supplemented by more than seventeen years of observation and examination in this state. For a detailed account of the food of the Crow as shown by stomach examination the reader is referred to the author's work on the Crow published by the United States Department of Agriculture in 1895.* The following abstract and summary of this investigation may be useful to those to whom the bulletin itself is not accessible:

The writer personally examined, classified and estimated the stomach contents of the 909 Crows on which the investigation was primarily based. The remains of insects found in these stomachs, after careful study in our own laboratory, were submitted to the Entomological Division of the Department of Agriculture and were determined by the members of that division, Mr. E. A. Schwarz submitting a report upon the insect food of the Crow which was embodied in the bulletin as finally published.

As a result of the detailed investigation of these stomachs and of the vast amount of other evidence gathered, the writer became fully convinced that the Crow on the whole is far more injurious than beneficial. The stomach examinations showed that the average amount of animal food in winter was 33 percent and in summer 67 percent, while the average amount of vegetable food was exactly complementary, that is, vegetable food formed 67 percent of the winter food and but 33 percent of the summer food. We may say therefore, speaking roughly, that the Crow's food for the year consists of nearly equal parts of animal and vegetable substances, the animal predominating in summer and the vegetable in winter.

Much the larger part of the animal food consists of insects, the average for the year amounting to about 24 percent. The proportion howeve varies widely according to season. Thus in January insects form less than 3 percent of the food, while in April they form 53 percent, in May 49 percent and in June 41 percent. This large percentage of insect food, and the common assumption that all insects are injurious, leads the careless observer to conclude that the Crow must be necessarily a very beneficial bird. As a matter of fact only a small part of the insects eaten are injurious, many are beneficial, others are neutral, and a large number—whether good or bad—are dead before they are picked up and hence have no bearing on the question. Furthermore the stomach examinations prove beyond doubt that the Crow must be held blameworthy for this neglect to eat at all many of the most common and injurious insects which attack the farmer's crops. The following extracts from Mr. Schwarz' report will give a fair idea of the insect food:

"The insect food is almost exclusively composed of terrestrial species, that is, such as are found on the surface of the ground, or hide during the daytime at the base of plants or under the various objects lying on the surface; or such as live in the dung of domestic animals, in decaying vegetable or animal matter, or underground. * * * The almost complete absence of the numerous arboreal insects of all orders * * * indicates that the birds when sitting or resting on trees do not pick up insects.

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* Barrows and Schwarz.—The Common Crow in its Relation to Agriculture. Bull. No. 6, 1895, Division of Ornithology and Mammalogy, U. S. Dept. of Agriculture.

"The almost constant presence of coprophagous (dung-eating) insects in the stomachs indicates that Crows preferably frequent dry pasture lands, dry meadows, or very open woods, where cattle or horses are grazing. In many instances the presence of certain species of *Chlænius*, water beetles, or an occasional aquatic hemipter or a *Gryllotalpa* or *Corydalus*, etc., shows that the birds frequent the margins of ponds or streams.

"The insect food of the Crow consists only of large or medium-sized insects; small species are only rarely, if ever, picked up. The smallest insects found are certain species of *Aphodius* (dung-beetles). Ants form a marked exception to this rule, as small or very small species are frequently found in many stomachs [doubtless taken with carrion].

"The Crow appears to prefer insects with a hard covering to the more soft bodied ones * * * no soft-bodied imagos (a few Diptera excepted) seem to be eaten * * * Crows derive a great deal of their food from the insects living in dung-heaps and dead animals, where dipterous and other larvæ abound, still these are but rarely met with in the stomachs. A marked exception to this rule is the frequent occurrence of spiders, and more especially of the family Lycosidæ or ground spiders. [These are neutral—neither harmful nor beneficial].

"Crows seem to have a predilection for insects possessing a pungent or otherwise strong taste or odor. This is exemplified by the prevalence of Carabidæ (among them the often recurring genus *Chlœnius*, possessing a peculiar odor), coprophilous or necrophagous coleoptera (Silphidæ, Histeridæ and Scarabœidæ Laparosticti), ants, and more especially by the almost constant occurrence of certain species of the heteropterous family Pentatomidæ (stink-bugs and spice-bugs).

"The following groups of insects representing the principal (insect) food supply of the Crow are arranged according to their relative importance, but this sequence might undergo some changes if an equal number of stomachs from all parts of the country were available for examination:

"1. Grasshoppers. During the months of May and June * * * grasshoppers, mostly of the genus *Tettix*, occur in the vast majority of stomachs, but with few exceptions in moderate numbers only. * * * Toward the end of June specimens of the typical locusts (grasshoppers, *Melanoplus* and allied genera) increase in number until in the month of August and throughout the fall they constitute by far the greatest part of the insect food, often occurring in astonishing numbers, and often forming the only insect food.

"2. Dung beetles. A larger or smaller number of dung-beetles, and more especially of the genera *Silpha*, *Hister*, *Copris*, *Onthophagus*, *Aphodius* and *Staphylinus*, occur in most of the stomachs from all localities and throughout the whole year, and in many instances comprise the greater bulk of the insect food.

"3. Ground beetles (Carabidæ). These occur likewise in the vast majority of stomachs from all localities and throughout the year, and the list of the species thus found is a very extended one. However, none of these species is ever represented by any considerable number of specimens in a single stomach.

"4. May beetles (*Lachnosterna*). During a short period of the year, commencing, in the latitude of Washington, D. C. at the end of April, and in Maine and Michigan about a fortnight later, and extending toward the end of June, these beetles furnish, as regards bulk, number of specimens, and frequency of occurrence, the principal insect food of the Crow. * * * Frequently large numbers are found in a single stomach and this often to the exclusion of other insect food. This habit prevails throughout the whole region and would occupy the foremost rank in this enumeration but for the fact that it is restricted to two months of the year. * * * The principal but by no means exclusive insect food of the nestlings may be said to consist of these May-beetles.

"5. Ground spiders (Lycosidæ). The only soft-bodied insects that occur in a very large number of stomachs from all localities and throughout the warmer seasons. * * * Often represented in considerable numbers in the stomachs, occasionally forming the greater bulk of the insect food.

"6. Weevils (Rhynchophora). Two species of weevils, *Epicærus imbricatus* and *Phytonomus punctatus*, both often referred to in economic entomology, occur abundantly in a large number of stomachs. They would play a very prominent role in the food supply of the Crow but for the fact that they are locally restricted. *Epicærus imbricatus* does not extend into the northern and northwestern states, and the clover weevil (*Phytonomus*) is a comparatively recent importation from Europe [First noted in Michigan in 1892, but now abundant and injurious].

"7. Cutworms (larvæ of Noctuidæ). Considering the enormous number of cutworms that occur, especially in spring and the earlier part of summer, in pastures, dry meadows, and open fields, and that they hide during the day * * * in just such places as are preferably investigated by the Crow in search of food, it is remarkable that they do not constitute the largest part of the insect food. Even if we include all other lepidopterous larvæ and pupæ found in the stomachs, this food does not by any means rank among the most prominent features. The only explanation that occurs to me * * * is that the Crow greatly prefers insects with hard bodies. Cutworms occur in many stomachs, usually singly or in very small numbers, rarely forming the bulk of the food in any one stomach and never the entire food. Noctuid pupæ were found only in isolated cases.

"8. Soldier bugs (Pentatomidæ). Although by no means representing a considerable portion of the insect food, the constantly recurring presence of various species of soldier bugs constitutes a characteristic feature in the food habits of the Crow. * * * It seems probable that the strong odor or taste of these soldier bugs is the reason why they are so eagerly sought by the Crows. * * * Those found belong to *Podisus, Euschistus,* and allied genera.

"9. Ants (Formicidæ). Ants form only a small proportion of the bulk of the insect food, but their frequent occurrence in the stomachs suggests the explanation that they are relished by the Crow on account of their peculiar acid taste. * * * The largest species, *Camponotus* and *Formica,* are most frequent. The presence of very small species is probably due to accident (picked up with dead or wounded May-beetles).

"Among insects which occurred only in a moderate number of stomachs and usually only as single specimens, or only in a few stomachs in large numbers, the following perhaps deserve mention:

"Click-beetles (Elateridæ). A tolerably large number of species but none represented by many specimens. Larvæ (wire-worms) were found only in a few isolated instances.

"Lamellicorn beetles. Lucanids occur occasionally, while various species of Scarabœids form in the aggregate a not inconspicuous portion of the insect food.

"Ants, bees, and wasps (Hymenoptera). Only a moderate number of species and specimens found, except of ants, already referred to.

"Flies (Diptera). The whole order is comparatively poorly represented. The small number of larvæ and puparia found in the stomachs is in striking contrast with their enormous abundance in the excrement of horses, cattle, etc., or in dead animals.

"Crickets (Gryllidæ). Very poorly represented. Ground crickets of the genera *Gryllus* and *Nemobius* occur in a moderate number of stomachs."

The complete or almost complete absence in the stomachs of numerous harmful insects which live in places readily accessible to the Crow is noteworthy. Witness the following from Mr. Schwarz' report:

"The absence of the large family of leaf-beetles (Chrysomelidæ) is striking. Not a specimen of the notorious Colorado potato beetle was found, nor a single larva of any member of the family.

"The absence of all cabbage-worms deserves mention, also the absence of the various Sphingid larvæ and their pupæ, which infest potatoes, tomatoes, sweet potatoes and tobacco. The corn-worm (larva of *Heliothis armigera*) is here specially mentioned because it is said that the Crows pull open and injure the ears of corn only for the purpose of getting at the corn worms. None were recognized in the stomachs.

"No traces of the Hessian-fly were found in the stomachs, but the small size of the larva and pupa, as well as their mode of occurrence, make it improbable that the Crows ever feed on this insect.

"Among all the stomachs examined only a single specimen of the notorious chinch bug (*Blissus leucopterus*) was found, and, unless we assume that this insect is too small, no explanation of its absence is offered.

"The more or less injurious leaf-hoppers (Jassidæ, Cercopidæ, Membracidæ) are not represented in the stomachs.

"No specimens of white ants (Termitidæ), the only injurious family of the order Neuroptera, occurred in the stomachs.

"All spiders are insectivorous but only a few are useful to man. The only family which is well represented in the stomachs (Lycosidæ) has no economic importance.

"No ticks (Ixodidæ) were found in the stomachs."

In summing up the good and harm done by the Crow in the consumption of insects we must give full credit for his work on grasshoppers, May beetles, click beetles and weevils. The work on grasshoppers is all good; the work on May beetles is likely to be greatly overrated, yet unquestionably is important. Many years of careful field work have convinced us that during the May beetle season the Crow gets a large part of its animal food from the refuse thrown up on the shores of sea, lake or stream. Frequently insects are drowned by the million, and anyone who will carefully search the shores of even the smallest pond in May, June and July will find scores if not hundreds of drowned insects. Often the Crow gorges itself with this food, and carries large amounts to its young, the May beetles almost always forming a conspicuous part. Moreover, myriads of May beetles are injured or killed outright by accident every night, and these dead or maimed beetles are among the commonest objects met with on pavements, roadways and paths everywhere in the early morning. Often they are covered with tiny ants which are trying to tear them to pieces or drag them away, and when the Crow discovers and swallows the beetles he takes the ants as well—the proof of this being evident in scores of the crow stomachs examined. In short, dead insects are just as palatable to the Crow as living ones, and there can be no question that a very considerable part of the insects found in the stomachs represent merely so much refuse animal matter, in fact carrion.

The work done on click beetles and weevils is commendable, but it is very much smaller in amount than that on grasshoppers and May beetles. The other harmful insects eaten are so few that they may be disregarded, even the cut-worms being insignificant.

Two groups of beneficial insects, however, must be considered, namely the ground beetles (Carabidæ) and the soldier bugs (Pentatomidæ). The Crow eats these constantly, and although it is impossible to say just how much harm is done in this way, it seems probable, all things considered, that it is sufficient to offset almost completely the good done in eating grasshoppers and May beetles.

This would leave a small balance in the Crow's favor from the consumption of injurious insects, but, as will be shown directly, this is practically the only credit to which the bird is entitled, and when weighed against the vast amount of harm done in other ways is absolutely insignificant.

The remaining part of the animal food of the Crow is made up mainly of rabbits, mice and other small mammals; snakes, frogs, toads, and fish; wild birds and their eggs; crayfish, crabs, clams, snails and other shell fish; and carrion. Taking up these items in the order mentioned, we may say at the outset that the evidence afforded by the stomach examinations must be weighed with considerable care in order to avoid misapprehension. For example the presence of flesh or fibres of meat, sinew and bone may mean that the Crow has been eating carrion or that it has been eating some of the birds or mammals already mentioned. The presence of a single tooth, a little hair, or a few entire bones or feathers may enable us to identify this material positively, but in most cases it is still impossible to say whether the remains thus identified are from individuals killed by the Crow or from dead animals, that is carrion. The stomach examinations show that the carrion not otherwise identified amounts to about 3 percent of the entire food; rabbits, mice and other small mammals form about 1.7 per cent; snakes, lizards, frogs, toads and fish form 2.2 per cent; remains of wild birds and their eggs, together with poultry and their eggs, form about 1 percent; crayfish and clams about 1.2 per cent.

Undoubtedly the Crow destroys a considerable number of young rabbits, pouncing upon them and killing them by blows of the beak and afterwards devouring them. But it also eats any remains of dead rabbits, young or old, which it may find. The same is true of mice, which would seem from the stomach examination, to form a rather constant item in the diet. Undoubtedly the Crow occasionally destroys the nests of meadow mice, particularly in early spring when the snow is melting away, and it then devours the helpless young, thereby doing some positive good. It must be remembered, however, that the normal mortality among field mice and meadow mice is considerable and the Crow unquestionably consumes hundreds of these little rodents, picked up as carrion. The same is true of frogs, toads, snakes and fish; for although any of these may be taken alive when opportunity offers, it is unquestionably true that the great majority of such remains in the stomachs are from individuals found dead by the Crow, thus merely representing so much carrion. The habit already referred to, of haunting the margins of pond, stream, and sea, points plainly to this fact in the Crow's economy, and nothing is more certain than that it watches the shores and patrols the water's edge continually on the lookout for such food. Similiarly when a stream, pond, or pool dries up the Crow is always on hand to get the dead or dying water animals thus left at its mercy. In all this work (with the possible exception of that on mice) no good of any importance is done, since the materials thus consumed would have been effectually disposed of by the various carrion-eating insects or by speedy dessication and decay, without injury of any kind to man.

The relation of the Crow to our wild birds and to domestic poultry is of decided importance. Perhaps no single trait has been more generally noted or more uniformly condemned than its habit of robbing the nests of other birds; not simply those of the robin, thrush, meadowlark and other song birds, but those of the quail, partridge, wild duck, sea gull, and various other birds or waterfowl, in fact the nest of any bird whatever, provided it can secure the eggs or young without too much danger to itself. The skill with which this is done is often amazing. Crows will pass back and forth in the vicinity of birds nests which seem to be plainly exposed and of which the Crows must know the location, yet day after day they will ignore these nests until precisely the right moment arrives, when almost invariably they descend upon the nest in the absence of the parents and devour or carry away for their young whatever the nest may contain.

The fact that the stomachs show so small a percentage of the remains of wild birds and eggs is readily explained by a consideration of the facts. In the first place the eggs usually are devoured at once by the Crow, not carried to the nest to be fed to the young; and in most cases the shells are entirely discarded, only the soft interior of the egg being swallowed. Again, the unhatched chicks or the nestlings devoured by the Crow or fed to the young contain few or no hard parts which can escape digestion and remain to be used as evidence against the criminal. The beak, bones and claws are all soft and in most cases the feathers are too small and undeveloped to be identified. Thus it happens that Crows may feed extensively upon the eggs and young of other birds, while the stomach contents may give little or no evidence against them. The complaints from sportsmen and naturalists alike, are almost unanimous in condemning the Crow for the destruction of immense numbers of the eggs and young of game birds and waterfowl; and all the evidence collected goes to show that, aside from climatic conditions, no single factor is so important as the Crow in reducing the number of these birds.

It is now known with certainty that the Crow destroys large numbers of chickens, ducklings and the young of other domesticated poultry.

Complaints of this nature come from all parts of the country, but naturally are most frequent in those regions where Crows nest abundantly. We have heard scores of complaints from farmers in Michigan and it may be safely affirmed that in this state Crows kill far more chickens than all species of hawks combined. In some instances poultry raisers have noticed the loss of young chickens continuously for days or even weeks without suspecting the cause, for although Crows were frequently seen in the vicinity they were not observed to trouble the chickens and in the absence of hawks it was difficult to account for the loss. Careful observation, however, shows that the Crow is very adroit in his chicken stealing, usually visiting the poultry yards very early in the morning, often before sunrise, although in some instances he becomes bolder and makes his visits at any time of day. Often he may be seen sitting on fence or tree not far from the barn, but apparently unconcerned about the chickens which may be near. He watches his opportunity, however, and at the favorable moment floats quietly to the ground, snatches up a downy chicken and flies swiftly away to the nearest woods.

For some obscure reason these visits of the Crow do not cause the flurry and alarm which follows the visit of the hawk, and often no outcry is raised except perhaps by the mother of the unfortunate chick. One successful exploit of this kind is followed quickly by another and in this way a score or more of chickens may be taken in the course of a week without the detection, or at least without the punishment, of the thief. Such robberies are more frequent when the broods of chickens are at some distance from the house and especially when the hen has stolen her nest in the woods some distance away. A Crow has no objection to taking the eggs of poultry when these can be had but except in cases like that just mentioned it seldom gets the opportunity.

Turning now to a consideration of the vegetable food of the Crow we find still less to commend and much more to condemn. Directly or indirectly the Crow inflicts a large amount of damage on the agriculturist and in most cases it is possible to estimate this loss with considerable accuracy and weigh it with approximate justice against the good.

The principal vegetable foods of the Crow are corn, wheat, oats, buckwheat and the seeds of some grasses and weeds, together with a considerable amount of acorns, chestnuts and beechnuts (collectively spoken of as "mast"), to which is added a comparatively small amount of cultivated fruits, particularly cherries, strawberries, and blackberries, and a rather larger amount of various wild fruits and berries. In the consumption of all this vegetable food the Crow is known to do good in but two ways; namely, in the destruction of a very limited amount of the seeds of grasses and weeds, and in the distribution or planting of chestnuts, acorns, beechnuts and the seeds of various more or less valuable trees, particularly those of the wild cherry (*Prunus serotina*) and the red cedar (*Juniperus virginiana*). The good work done in this way should of course be taken into consideration, but it is not greater, if it is as great, as that done by numerous other species; moreover it is entirely offset by the large amount of harm done by distributing the seeds of poison sumac and poison oak or poison ivy (*Rhus venenata* and *toxicodendron*).

In common with many other birds the Crow eats freely the berries of all the species of *Rhus*, but is particularly fond of the poisonous species above named, and during the colder half of the year it often eats these in immense quantities. The writer has frequently taken more than a hundred seeds of the poison ivy from the stomach of a single Crow, and among hundreds of stomachs collected in cold weather not 5 percent failed to contain some of these seeds. In the gizzard of the Crow the nutritious pulp of these berries is quickly separated from the hard bony seeds, and the latter, mixed with large quantities of the sand and gravel used for grinding, are choked up by the Crow in compact masses of twenty to fifty seeds at a time. These seeds are not injured in the least by this process and the greater part of them are distributed by the Crow under conditions which favor their germination and growth. It is difficult to estimate the amount of harm thus done, but it is safe to say that the misery thus caused is enormous and our estimate of it is not lessened by the fact that numerous other birds assist in the harmful work.

The consumption of ripened grain (including corn) perhaps is not very great, although we have scores of complaints relating to the destruction of green corn, corn "in the milk," and corn "in roasting ear" by Crows. In such cases the amount of damage seems to depend largely upon the location of the field, and it is usually noted that the rows which are nearest the woods, or which are least exposed to human observation, are the ones which suffer most. It is not uncommon to find more than 50 percent of the ears in ten or more of the outermost rows seriously damaged if not entirely destroyed. At this time the Crows are in flocks of considerable size formed by the union of three to thirty family groups and the marauding parties often consist of thirty to eighty individuals.

But by far the most serious injury which the Crow does the farmer is in pulling up the corn which has just come through the ground. This habit is so well known and the complaints are so universal that it seems idle to spend time in discussing the fact. There are those who claim that the mischief is done by chipmunks, gophers, or even red squirrels, and it is well known that the Crow-blackbird or Bronzed Grackle does a certain amount of damage in the same way. But beyond question the larger part of this work is done by the Crow alone. A few seemingly intelligent people still claim that in pulling corn in this way the Crow is carefully searching for the wire-worm, the cut-worm or the white grub found at the root. This claim has been absolutely disproved by repeated observations and by examinations of stomachs of Crows which had been feeding on corn pulled in this way. In no case have any of the insects above named been found in the same stomach with sprouted corn, and it may be added that these three groups of insects are rarely found in Crow's stomachs at all. The cutworm being distasteful to the Crow is taken only as a last resort.

The consideration of the foregoing facts should convince any candid mind that in the long run the Crow must prove far more injurious than beneficial to the agriculturist. The question now naturally arises, what can be done to prevent the harm? Two methods of procedure suggest themselves: (1) The more or less complete destruction of Crows. (2) The more or less complete protection from Crows of the crops which he injures.

Destruction of the Crow is hardly practicable. The conditions are such that in spite of persecution of all kinds the Crow is sure to survive at least in small numbers. The use of poison, the gun, and bounties have effected a temporary lessening of numbers in limited areas, but all these factors combined are insufficient to secure extermination. Nor is this altogether to be regretted. In spite of his many bad qualities the Crow has an attractive personality and his presence in small numbers adds a picturesque element to the landscape which the nature lover can ill afford to lose. Probably few, even of the most inveterate Crow haters, would care to see the species completely exterminated. Doubtless, however, it is perfectly safe to allow the killing of the Crow at all seasons and in almost any manner, for his watchfulness, intelligence and hardiness seem sufficient to insure the survival of a moderate number in spite of everything. On the one hand it does not seem wise to afford him the protection which the law gives to most species, while on the other hand the offer of bounties is ill advised for many reasons. Among these is the fact that Crows can be most readily killed during the nesting season, and anything which takes the man with a gun into the field during the season for game is always to be deplored. The average American, particularly the young American, is always ready to kill, and if he does not find Crows is sure to satisfy his ambition with the killing of some other and valuable bird.

The protection of poultry and the nests of wild birds against the ravages of the Crows is practically impossible, and so long as Crows exist they will continue to distribute the seeds of the poison sumacs.

In one direction only can the farmer secure partial protection from the Crow. If he is willing to prepare his seed corn by moistening with tar oil or some similar material before planting the Crow will seldom make any attempt to pull up this corn after it has sprouted. This practice, known as the "tarring of seed corn," has been in common use in Maryland, Virginia and parts of Pennsylvania and Delaware for more than a hundred years and if properly used seems to be quite effective. The protection secured doubtless depends upon the strong flavor which the tar imparts to the growing shoot and young plant, until the latter is at least several inches high. It is not necessary or desirable to soak the grain in strong tar oil, but merely to coat it lightly so that enough of the material will remain upon the kernel to give a strong flavor to the young plant. There are several objections to the method, the most important being that it involves a considerable amount of additional labor, especially as the planter can seldom be used for this prepared seed.

The usual method is to soak the seed corn for ten or twelve hours in water and then drain off the water and stir the corn with a stick which is dipped at short intervals into the tar oil. When the kernels have become distinctly brown from the coating of tar air-slaked lime, wood-ashes or fine road dust is stirred into the grain until the kernels no longer stick together. In this condition the corn can be planted by hand and will sprout in due time. Too heavy a coating of tar may hinder the absorption of water from the soil, and a too thorough soaking in tar oil may entirely prevent germination. A few farmers claim that such preparation has not protected their corn but that the Crows pulled it almost as if untarred. The general verdict, however, is decidedly otherwise, and most corn growers would follow the practice regularly were it not for the labor involved.

The use of "scarecrows" is quite general and most people are familiar with the human effigies of straw and old clothes which do duty in this way, as well as with the small windmills, rattles, wires, jingling tin and sheet iron suspended from poles and moved by the wind. Perhaps the most effective of these devices consists in stretching white twine around and across the newly planted field, especially if the strings be stretched in two directions so as to form a coarse net work over the field. The protection secured in this way, however, is seldom complete or long continued.

TECHNICAL DESCRIPTION.

Feathers of the throat broad and blended at the tips, like those of the breast and back; tail but little rounded, the lateral feathers hardly an inch shorter than the middle ones; entire plumage black, as in the Raven, with similar greenish, bluish and purplish reflections; bill and feet black; iris dark brown. The sexes are nearly alike in size and color, though females may average a little smaller. The young just after leaving the nest are duller black than the adults, lacking the glossiness and metallic reflections.

Length 17 to 21 inches; wing 11.90 to 13.25; tail 6.90 to 8; culmen 1.80 to 2.05.

Family 55. ICTERIDÆ. Orioles, Blackbirds, etc.

KEY TO SPECIES.

- A. Plumage showing some bright yellow or red. B, BB.
  - B. With red or red and yellow. C, CC.
    - C. Breast orange red, tail with much yellow and black. Baltimore Oriole, male. No. 203.
    - CC. Shoulders alone red, tail without yellow. Red-wing and Thick-billed Redwing, adult male. Nos. 198, 199.
  - BB. Without red; under parts largely yellow. D, DD.
    - D. Throat yellow. E, EE.
      - E. A black crescent on chest; breast and belly yellow. Meadowlark and Western Meadowlark. Nos. 200, 201.
      - EE. No black crescent on chest. F, FF.
        - F. Entire head and neck yellow, breast and belly black, white patch on wing. Yellow-headed Blackbird. No. 197.
        - FF. Entire under parts yellow, two whitish wing-bars. G, GG.
          - G. Under parts light greenish yellow, wing 3.25 or less. Orchard Oriole, female. No. 202.
          - GG. Under parts reddish yellow, wing 3.50 or more. Baltimore Oriole, female. No. 203.
    - DD. Throat black. H, HH.
      - H. Tail with much yellow and black. Baltimore Oriole, male. No. 203.
      - HH. Tail greenish yellow, without black. Orchard Oriole, young male. No. 202.
- AA. Plumage without bright red or yellow. I, II.
  - I. Distinctly streaked below. J, JJ.
    - J. Breast and sides thickly streaked with black or dusky on a nearly white ground color. K, KK.
      - K. Streaks sharp and black. Redwing, female. Nos. 198, 199.
      - KK. Streaks blended and dusky. Cowbird, young, and some adult females. No. 196.
    - JJ. Under parts clear buff, streaked mainly on the sides, with black. Bobolink, female, and fall specimens of both sexes. No. 195.

II. Not streaked below. L, LL.

L. Mainly black or slate color all over, and without any white in wings. M, MM, MMM.

M. Large, length 11 to 14 inches, tail much graduated. Bronzed Grackle. No. 205.

MM. Medium, length 8 to 10 inches, tail nearly square, bill slender. Rusty Blackbird. No. 204.

MMM. Small, length 6 to 8 inches, tail square, bill short and thick. Cowbird, male and female. No. 196.

LL. Not all black or slate color, some white on wings. N, NN, NNN.

N. Under parts clear black, upper parts largely white. Bobolink, adult male. No. 195.

NN. Under parts mainly rich chestnut, only throat and chest clear black. Orchard Oriole, adult male. No. 202.

NNN. Under parts plain greenish yellow, upper parts plain olive, two whitish wing-bars. Orchard Oriole, female. No. 202.

195. Bobolink. Dolichonyx oryzivorus (*Linn.*). (494)

Synonyms: Skunk-head Blackbird, White-winged Blackbird, Meadowwink, Towhee (mistake), and, at the south, Rice-bird and May-bird.—Fringilla oryzivora, Linnæus, 1758.—Dolichonyx oryzivorus, Swains., 1827.—Emberiza oryzivora, Wilson.

Plate XLIII.

Male in spring entirely black below, mixed black, white and cream above; female everywhere pale buff, the upper parts and the sides streaked with black. In both sexes and at all ages and seasons the tail-feathers are very sharp pointed.

Distribution.—Eastern North America, west to Montana, etc.; north to Ontario and the southern parts of Manitoba, Assiniboia, and Alberta; south in winter to the West Indies and South America. Breeds from the middle states northward, and winters south of the United States.

In Michigan the Bobolink is a summer resident over by far the larger part of the state. Wherever there are open meadows and grain fields the bird is found at least occasionally, but it must be considered an infrequent resident of the entire Upper Peninsula, and even in the Lower Peninsula it is far more abundant south of the parallel of 44° than north of it. In a general way the Saginaw-Grand Valley may be said to be the northern limit of its abundance, but we have records of its occurrence, sometimes in considerable numbers, in almost every county in the Lower Peninsula, and it occurs regularly, although in comparatively small numbers, in parts of Mackinac, Chippewa, Delta and Marquette counties in the Upper Peninsula, and will doubtless be found at various other points. It is a bird of such striking appearance and beautiful song that it is not likely to be overlooked at any point where it occurs in numbers.

This is one of our finest songsters and also one of the birds which is believed to be most beneficial to the farmer as a consumer of insects injurious to mowing lands, meadows and grain fields. It arrives from the south the last of April or the first of May, the dates ranging at Petersburg,

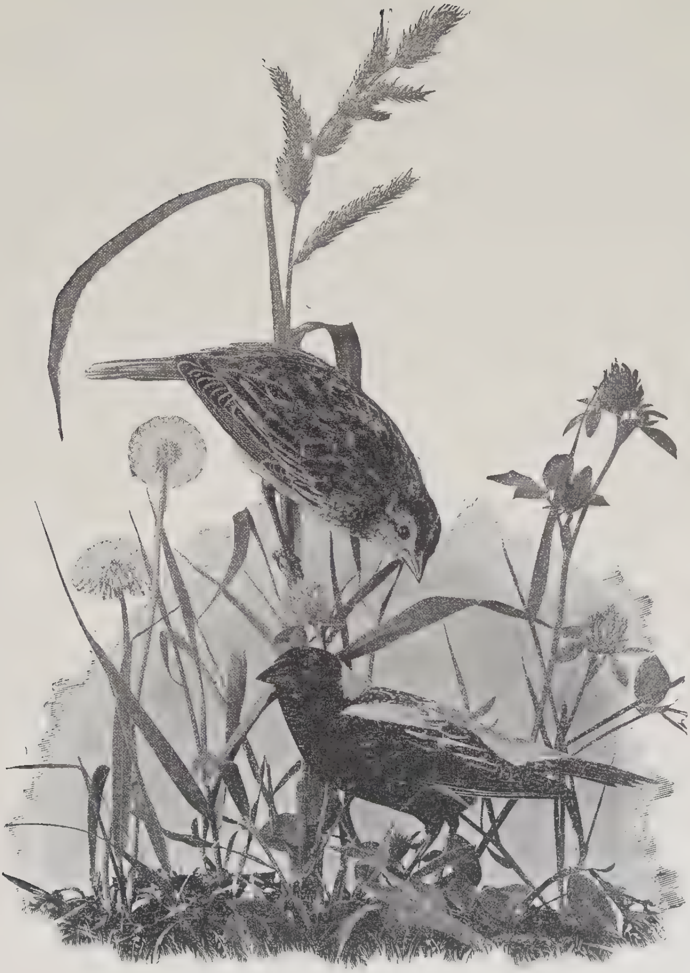

Plate XLIII. Bobolink. Male and Female.

Reprinted from Chapman's Handbook of Birds of Eastern North America.
By courtesy of D. Appleton & Co.

Monroe county, from April 26, 1885 to May 6, 1897, while at South Frankfort, Benzie county, Mich., the earliest date is May 21, 1892, and there is a single record at Sault Ste. Marie on May 28, 1900. As in many other cases the males usually precede the females by a week or more and nesting does not begin until perhaps a fortnight later.

Nests with fresh eggs are most often found during the first week in June, but in some years they may be built as early as the 20th of May. The nest is invariably placed on the ground, usually sunk flush with the surface, somewhat deeply hollowed, and carefully concealed by the surrounding vegetation. It may be placed in a meadow, a pasture or a grain field, and occasionally in ground so low that it is flooded by heavy rains. So thoroughly is the nest concealed that it is seldom discovered while it contains eggs, except by flushing the female from the nest, but after the young are hatched a little careful watching of the birds usually will indicate the exact location. The eggs vary from four to seven, but are commonly five or six in number. They are dull white, heavily spotted with dark brown or bluish, and often irregularly scratched and pen-marked with black. They average .83 by .61 inches. But one brood is reared in the season.

From the time of arrival until the young are out of the nest the males sing constantly and the indescribable song is by many considered the most remarkable, if not the most beautiful, of any of our bird songs. As soon as the young are on the wing the male begins to moult his dark suit and usually by the first of August can be distinguished from the female only by his somewhat larger size and rather deeper yellow color. At this time young and old resemble each other quite closely and, many families uniting into one flock, they roam from one meadow or grain field to another, feeding freely upon grass seeds, weed seeds, and sometimes upon grain (most commonly oats) in the milk. The damage done in this way, however, is negligible and is more than offset by the destruction of weed seeds, which must be enormous. Moreover, during the entire nesting season both old and young feed very largely upon insects, thus conferring a vast benefit upon the agriculturist. Among these insects weevils, cutworms and grasshoppers are conspicuous, and although numerous other insects are consumed those just named appear to form the bulk of the insect food during June, July and August.

Although one of our most beautiful and valuable birds, it would be hardly fair to withhold the statement that our Bobolink passes southward about the first of September, and uniting with various species of blackbirds pillages the rice-fields of South Carolina, Georgia and the Gulf Coast where it is commonly known as the "Rice Bird." The damage done to ripening rice is very great and it not unfrequently causes losses of thousands of dollars to individual planters. Prof. F. E. L. Beal makes the following statement in this connection: "The picturesqueness of the Bobolink and the melody of its song do not offset the financial loss and harrassing care of the southern rice grower. As the case stands at present the harm done by the bird far outweighs its benefits; but it is to be hoped that science may devise some means by which the rice growers may be relieved from some portion, if not all, of the labor and expense now incident to saving their crops from its devastations" (Bull. No. 13, Division of Biological Survey, U. S. Dep't of Agriculture).

TECHNICAL DESCRIPTION.

Adult male in spring: Entire top of head glossy black; occiput, nape and hind neck rusty white, buffy, or pure white; outer scapulars, rump and upper tail-coverts white or whitish; interscapulars mainly black, usually streaked with rusty or whitish; entire under parts clear black except for whitish or rusty edgings on some feathers of abdomen and under tail-coverts; wings and tail pure black, the tertiaries rather broadly margined with whitish, and the first three primaries with very narrow white edges; bill bluish black; iris dark brown; legs and feet brown.

Adult female in spring: Top of head deep brown, with a median stripe of grayish buff, which is also the ground color of the entire upper parts, but plentifully streaked and spotted with dark brown and blackish, most heavily on the scapulars and interscapulars; under parts clear buff or grayish buff, more or less streaked on sides, flanks and under tail-coverts with blackish, the chin nearly pure white; wings and tail brownish, with narrow light edgings; upper mandible reddish brown, lower flesh colored; feet and legs pale; iris light brown.

Adult male in autumn: Similar to summer female, but the ground color a deeper, richer buff, and the streaking more pronounced. Autumn females, and young of both sexes, are similar but paler than the autumn male, the females usually separable by smaller size.

Male: Length 7 to 7.60 inches; wing 3.50 to 4; tail 2.75 to 3; culmen about .55. Female averaging about one-half inch shorter, the wing about one-fourth inch less.

196. Cowbird. Molothrus ater ater (*Bodd.*). (495)

Synonyms: Cow Blackbird, Cow Bunting, Lazy Bird, Brown-headed Blackbird.—Oriolus ater, Boddaert, 1783.—Molothrus pecoris, Aud., Bonap., Baird, and others.—Emberiza pecoris, Wils.

Plate XLIV.

Smallest of our blackbirds. Male, metallic greenish black, the entire head and neck brown; female, dirty grayish brown.

Distribution.—United States from the Atlantic to the Pacific, north into southern British America, south in winter into Mexico.

This, the smallest of our blackbirds, is abundant throughout the state and well known not only from its constant association with cattle in the pasture, where it is seen feeding about their feet and perching upon their backs, but also on account of the remarkable habit of laying its eggs in the nests of other birds. It never builds a nest of its own, nor does the female take any care whatever of its young. The birds are polygamous and are commonly found during spring and summer in small flocks of twenty or less in which the males may outnumber the females or vice versa.

When the female is about to lay she searches for the nest of some smaller bird, preferably a warbler or a sparrow, and watching her opportunity deposits her egg in the nest while the owner is temporarily absent. Usually the owner of the nest accepts the situation and hatches the egg along with her own, and eventually the young cowbird is reared, very often at the expense of the other young; for, being larger, stronger and more voracious, the young Cowbird demands and receives the larger part of the food brought by the parents, so that, if not crowded out of the nest, the rightful young are often starved to death. That this is not always the case is shown by the fact that nests are occasionally found containing a single young Cowbird and two or more young warblers or sparrows all nearly or quite ready to leave the nest. It is much more common, however, to find a pair of warblers or vireos feeding a single young Cowbird. It is claimed that the Cowbird is careful to select a nest already containing eggs, but this certainly is not true in Michigan, since scores of deserted nests are found each year con-

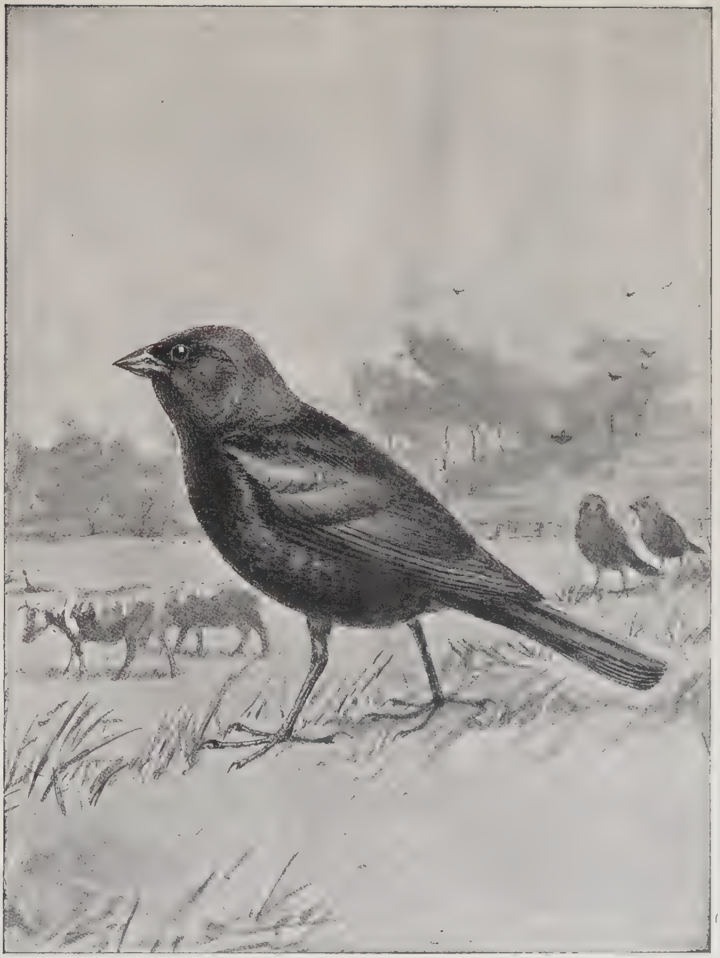

Plate XLIV. Cowbird. Male.

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taining single eggs of the Cowbird. It is also common to find a nest containing two, three, or even four Cowbird's eggs along with one or more eggs of the rightful owner. Ordinarily such nests are promptly deserted.

The species most commonly imposed upon are the various warblers, flycatchers, vireos and sparrows which nest in exposed situations where the Cowbird can readily find them. Nevertheless, a very large number of small birds suffer from the visits of the Cowbird, and a few species which nest in the deep woods are frequently victimized, among them the Ovenbird. Captain Bendire gives a list of ninety-one species and subspecies in whose nests Cowbirds' eggs have been found, and states that undoubtedly a number of others yet remain to be added to the list. In a few cases a bird thus imposed upon builds a false bottom or shelf above the eggs of the intruder and also raises the rim of the nest, thus leaving the Cowbird's egg to become stale in the basement while it lays its own eggs above. This, however, does not always secure safety, for the same or another Cowbird is likely to visit the nest again and leave another egg. Such two-story nests are not uncommon in collections, and occasionally even a three-story nest is found. We have such a one, built by a yellow Warbler, in our college collection. The Cowbird's eggs are variously speckled and spotted with brown on a soiled white back-ground, often with a greenish tinge, and average .81 by .66 inches.

The Cowbird arrives from the south about the first of April. At Petersburg the earliest record is March 17, 1889 and the latest April 27, 1892. At Grand Rapids the dates are April 1 to April 4, and at Sault Ste. Marie the single record we have is April 22, 1901. The males come first, and often singly or with flocks of other blackbirds, and it is not until nine or ten days after their arrival that they are seen in flocks with the females.

Their food has been carefully studied by the Division of Biological Survey of the United States Department of Agriculture, and is found to consist of about 22 percent of animal matter and 78 percent of vegetable matter. Insects form about 20 percent of the food for the year, but are mainly taken in May, June, July and August. The Cowbird appears to eat few beneficial insects, avoiding the predaceous ground beetles, but eating a few wasps, bees and ants. Its best work is in destroying grasshoppers which form about half the insect food, and in August make 45 percent of the entire food of the species. It also eats snout beetles or weevils (about 2 percent), and caterpillars to about the same extent. Among the latter are a few cutworms, and the armyworm (*Leucania*) was found in four stomachs. Contrary to expectation it eats few flies or maggots, and there is no proof whatever that it eats intestinal worms from cattle droppings, or ticks from the animals themselves. In fact, the association of this bird with cattle has never received any satisfactory explanation.

The vegetable food consists mainly of weed seeds and grain, the former predominating. Many stomachs contained nothing but weed seeds and clover seed, and many others nothing but these and grain. The latter is largely waste grain, principally oats, but a considerable part is from newly sown fields. The Cowbird does no harm to cultivated fruits. On the whole its food would indicate that it is rather more beneficial than harmful. It must not be forgotten, however, that in causing the death of multitudes of small birds, all of which are valuable to the agriculturist, this blackbird is doing an injury for which no amount of beneficial work in other directions can ever atone. It is one of the few species of native birds which might well be exterminated if possible.

TECHNICAL DESCRIPTION.

Adult male: Entire head and neck uniform glossy dark brown; rest of plumage glossy greenish black, usually with a purplish tinge where the brown and black areas merge; bill and feet black; iris dark brown.

Adult female: Dull brownish gray to plain dark gray, somewhat darker above than below; throat much lighter, sometimes soiled white; breast and belly often obscurely streaked with dusky; bill and iris brown.

Young: At first quite similar to the adult female, but more distinctly streaked below; young males, however, begin to assume the adult plumage in early autumn, and are often seen patched in various degrees with gray and deep black.

Male: Length 7.75 to 8.25 inches; wing 4 to 4.60; tail 2.90 to 3.35; culmen .61 to .72.

Female: Averages about one inch shorter, the wing about 3.75.

197. Yellow-headed Blackbird. Xanthocephalus xanthocephalus (*Bonap.*). (497)

Synonyms: Copperhead.—Icterus xanthocephalus, Bonaparte, 1826.—Agelaius xanthocephalus, Sw. & Rich., Aud., Baird.—Xanthocephalus icterocephalus, Coues, B. B. & R., Lawr., Ridgw. and many others.

Male glossy black with bright yellow head and neck in sharp contrast, and a pure white patch in the wing which is conspicuous in flight. Female similar, but smaller, browner, the yellow duller and no white in the wing.

Distribution.—Western North America, from Wisconsin, Illinois and Texas to the Pacific Coast, and from British Columbia and the Saskatchewan River southward to the valley of Mexico. Accidental in Ontario and the Atlantic states.

The Yellow-headed Blackbird must be considered a straggler in Michigan and a very rare one at that. A single specimen, an adult male, was taken May 17, 1890, near Iron Mountain, Dickinson County, Mich., by Mr. E. E. Brewster. Mr. Brewster has kindly donated this specimen to the College and it is now in our collection, numbered 8044. This, so far as we can learn, is the only unquestionable Michigan specimen in existence. There is a specimen in the Barron collection at Niles, Mich., which may have been taken in that vicinity, but it is without any label and its origin is entirely unknown. Mr. John Hazelwood of Port Huron states that a single specimen of this species was brought to him for identification by a boy who had shot it, but the specimen was not preserved and the date of capture is not known. A. B. Covert of Ann Arbor states that specimens have been secured on the Monroe marshes in Monroe county, and he has a note to that effect on the margin of his copy of Coues Key, but no definite data as to these specimens have been found. There is in the University of Michigan collection a specimen of the Yellow-headed Blackbird labeled "Scolecophagus carolinus, Mich., J. Hobson & Son." It is a young bird, but evidently was well able to fly. N. A. Wood informs us that Hobson was once curator of the University Museum, and he feels sure that this specimen must have been taken in the immediate vicinity of Ann Arbor.

The bird is known to nest abundantly in certain parts of Wisconsin, and it formerly nested in numbers in Lake county, Indiana, within a very few miles of the Michigan border. The Gibbs collection contains a set of four eggs taken at Sheffield, Lake county, Ind., June 16, 1878, by Geo. F. Clingman, nest in wild rice two feet above the mud. It also breeds in northeastern Illinois and it is not impossible that small colonies may occasionally nest in Michigan territory in the southern tier of counties. It is a prairie bird, nesting in the marshes and sloughs after the manner of the Red-winged Blackbird and feeding largely on grain and weed seeds as do the other blackbirds.

It builds a bulky nest and lays from four to six eggs, which are thickly speckled with brown on a gray back-ground, sometimes with pen scratches of black. The eggs average 1.05 by .71 inches.

Although a handsome bird it seems to be doubtfully beneficial, according to Prof. Beal's study of its food in the Biological Survey at Washington. He finds that about 30 percent of its food consists of insects harmful to vegetation, all taken from the ground, mainly beetles, grasshoppers and caterpillars. Among the latter the army-worm is not uncommon. On the other hand it gleans waste grain from roadsides, barn yards and pastures like the Cowbird, but it also visits grain fields in large flocks and eats enough to cause much complaint among farmers. Oats and wheat suffer most.

TECHNICAL DESCRIPTION.

Adult male: Feathers about the base of bill, including the lores and small area about the eye, deep black; rest of head, neck and chest bright canary yellow, sometimes almost orange; usually a few yellow feathers about the vent and on the thighs (tibiæ); a conspicuous pure white patch on each wing, including the primary coverts and often some of the greater coverts; rest of the plumage, including wings and tail, glossy black; bill and feet black; iris brown. Adult female: Decidedly smaller; brownish black, only the chest, throat and a line over the eye dull yellow; breast with some whitish intermixed with the dark; no white wing-patch. Young: Similar to adult female. In autumn and winter the adult male has the bright yellow much obscured by dusky or brownish tips of the feathers.

Male: Length 10.60 to 11.10 inches; wing 5.65 to 5.80; tail 4.50 to 4.85; culmen .75 to 1. Female: 9 to 10 inches; wing 4.40 to 4.65; tail 3.50 to 3.70.

198. Red-winged Blackbird. Agelaius phœniceus phœniceus (*Linn.*). (498)

Synonyms: Red-wing, Red-shouldered Blackbird, Swamp Blackbird, Red-winged Starling.—Oriolus phœniceus, Linn. 1766.—Icterus phœniceus, Bonap., Nutt.—Sturnus prædatorius, Wils., 1811.—Agelaius phœniceus of most other authors.

Figures 100, 101, 102, 103.

Adult male mainly or entirely black except for the shoulders (lesser and middle wing-coverts), which are brilliant scarlet bordered with buffy white. Female and young streaked with brownish or grayish above and below, and mottled or not with dull red on the shoulders.

Distribution.—North America in general from Great Slave Lake south to Costa Rica, with minor exceptions.

In Michigan the Red-winged Blackbird is almost universally distributed and breeds in every part of the state where suitable conditions are found. It is, however, much more plentiful in the middle and southern portions of the state, although this may be due largely to the greater abundance in these sections of marshes, cattail swamps and similar ground for which it has a decided preference.

It arrives from the south very early, the first flocks (which consist entirely of males) frequently entering the southern tier of counties before the end of February (Petersburg, Feb. 18, 1893), and

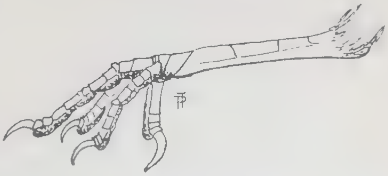

Fig. 102.
Leg and foot of Red-winged Blackbird.

reaching all parts of the Lower Peninsula before the end of March in ordinary seasons. At Lansing the males commonly arrive between the 10th and 20th of March and the females follow a week or ten days later. Nesting does not begin until May, and even in the southern part of the state probably not many eggs are laid before the middle of that month, while in the northern part of the state the first eggs are found the latter part of May and first of June. Undoubtedly a great many of the birds rear second broods in July, but this habit is not universal and it is difficult to say to what proportion it applies. The species is more or less polygamous, a single male often mating with two, three, or possibly more females and driving other males away from the immediate vicinity.

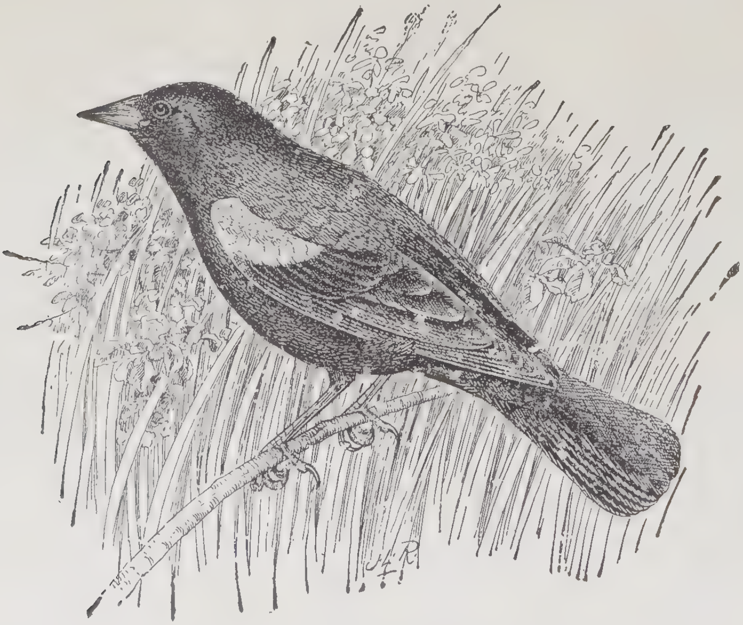

Fig. 100. Red-winged Blackbird. Adult Male.

From Farmers' Bulletin No. 13, Biological Survey, U. S. Department of Agriculture.

The nest is commonly a somewhat bulky and substantial structure woven out of coarse grasses and weeds and lined with finer material of the same kind. It is most often attached to the stalks of grass, reeds or flags at heights ranging from a few inches to several feet above the water, or in rarer instances above the ground. Not infrequently nests are placed in wild rose bushes, low willows or other slender shrubs growing in water, and more rarely in a tree of some kind at a height of a dozen feet or more. Occasionally nests are found placed close to the ground or even directly upon it, but this is exceptional.

The eggs are three to six, most often four or five, and are greenish or bluish white variously dotted, spotted and often pen marked with brown, purple, lavender and black. They average .97 by .67 inches. The birds are more or less gregarious even when nesting, and in favorable localities scores, or even hundreds, of nests may be found placed here and there at intervals of but a few yards, sometimes only five or ten feet apart.

The song, if it can be called such, commonly consists of three syllables which Emerson writes "o-ka-lee," and Samuels as "quonk-a-ree." Nehrling writes this "con-cur-ee," and calls its whistling note "tii-tii." This whistle is one of the clearest and most penetrating of bird-calls and in clear weather can be heard at great distances. When one is collecting in a marsh where Red-wings are nesting in numbers this persistent and powerful whistle becomes so monotonous and yet so painful to a sensitive ear that at length the irritation becomes almost unbearable.

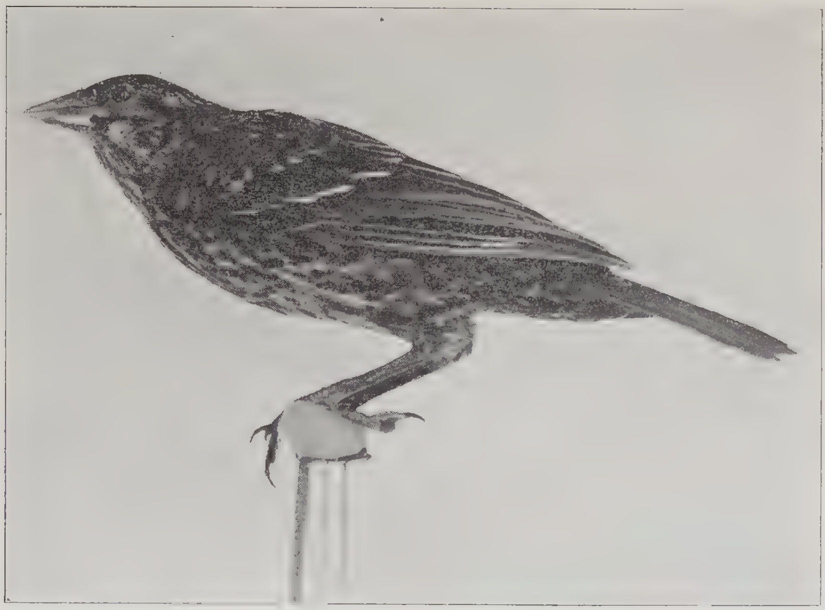

Fig. 101. Red-winged Blackbird. Young about five days from nest. Photograph from mounted specimen. (Original.)

As soon as the young are able to fly the birds gather into larger or smaller flocks and begin to forage on the cultivated fields in the vicinity, retiring at night to the cattail marshes to roost. It is at this time that the greatest harm is done to grain, for the birds sometimes assemble in flocks of twenty to fifty thousand and are capable of inflicting heavy damage upon oats or wheat. This has been more particularly the case in the past, for in the early history of the state the breeding grounds of the blackbirds were extraordinarily abundant and the grain fields were few and far between. Thus an immense blackbird population was likely to concentrate on a small acreage of grain, naturally with disastrous results. The steady increase in the area of cultivated lands, and perhaps more especially the drainage of a large part of the swamps and marshes, has changed these conditions completely; at present not nearly as many blackbirds are reared in the state and these distribute their attacks over a much larger area so that the loss to any one farmer is very small.

Studies of the food of the Red-wing bring out three points of particular interest: It eats immense quantities of grass seed and weed seeds, a moderate amount of grain of various kinds, and a considerable number of insects, the greater part being injurious species. According to Beal,* in 1083 stomachs examined more than half the food (55 percent) was grass and weed seeds, particularly seeds of pigeon grass or foxtail, bitter-weed, smartweed, dock, sorrel, etc.; 14 percent was grain, half of which was waste grain; while the other vegetable matter was of little account. Insects formed 26 percent of the food, with beetles heading the list and caterpillars and grasshoppers next. Practically all the insects are taken from the ground and by far the larger part are injurious forms. Among these may be named weevils or snout-beetles, cutworms (including army worms), span-worms, chafers, and grasshoppers. About one-fourth of the beetles are predaceous forms, and thus more or less beneficial, but as a whole this blackbird does excellent service for the farmer in ridding his fields and meadows of harmful insects. In regions where the bird is but moderately plentiful the balance is largely in its favor, but where it is very abundant its inroads on grain are too serious to be overlooked.

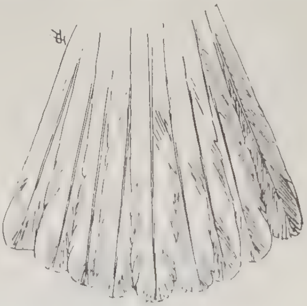

Fig. 103.
Tail of Red-winged Blackbird.

TECHNICAL DESCRIPTION.

Adult male in summer: Glossy velvet black all over, except shoulders (lesser wing-coverts) which are bright scarlet, and the middle wing-coverts which are buffy or creamy white, forming a broad margin for the red shoulders. In autumn all the black feathers (except primaries and tail-feathers) are margined with buff, rusty red, or even chestnut, most broadly and heavily on back, scapulars and tertiaries, more narrowly and lightly on under parts; bill and feet bluish-black; iris brown.

Adult female in summer: Smaller and otherwise entirely different. Upper parts brownish black, more or less streaked with ashy or whitish, with a more or less distinct median light stripe on the crown, and a distinct whitish stripe over the eye; under parts streaked lengthwise with whitish and black in almost equal amounts, the chin and throat reddish or yellowish and faintly or not at all streaked; shoulders usually mixed red and black, occasionally nearly as red as in the male, sometimes without any red; bill brownish black; iris brown. Young at first resemble the adult female, but males are soon separable by larger size and darker color pattern.

Male: Length 9 to 10 inches; wing 4.60 to 5.05; tail 3.55 to 3.95; culmen .88 to 1.
Female: Length 7.50 to 8.50 inches; wing 3.80 to 4.25; tail 3.10 to 3.40; culmen .72 to .80.

199. Thick-billed Red-wing. Agelaius phœniceus fortis *Ridgw.* (498d)

Synonyms: Northern Red-wing.

Similar to the common Red-wing, but decidedly larger, with the bill relatively much shorter and thicker.

Distribution.—Central North America, breeding northward; migrating from Manitoba south to Illinois, Indian Territory, and western Texas, westward to and including the Rocky Mountains, and south to Arizona and Chihuahua.

The Thick-billed Red-wing is a new subspecies of blackbird described by Ridgway in 1901, and as yet but imperfectly known as to habits and distribution. So far as we know now it has been found within Michigan territory only at Isle Royale, Lake Superior, where, in the fall of 1904, members of the University of Michigan expedition took four specimens, two males on August 18 and 26 and two females on August 24 and 29. Several flocks were seen during the month of August and it is possible that all belonged to this subspecies, but more likely that the flocks were mixed.

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*Biological Survey Bull. 13, pp. 33-44.

Again, in 1905, this subspecies was found in numbers on Isle Royale and about fifty specimens were taken. They appeared first on August 19, in large flocks, which seemed to consist entirely of immature birds and adult females, since no adult males were taken. Several specimens of the common Red-wing (*phœniceus*) were taken on August 18, but none after the Thick-billed Red-wing appeared. It seems almost certain that the latter form does not nest on Isle Royale (Peet, An. Rep. Mich. Geol. Surv., 1908, 362-363). We do not know of any differences in feeding or other habits between this subspecies and the typical Red-wing. Its nest and eggs are as yet unknown.

TECHNICAL DESCRIPTION.

The original description of this subspecies is as follows: "Similar to *Agelaius phœniceus phœniceus*, but decidedly larger, with bill relatively much shorter and thicker; adult female, adult male in winter, and immature female, similar in coloration to the same of *A. p. sonoriensis*, but distinguished by very different measurements" (Ridgway, Proc. Wash. Acad. Science, III, April 1901, p. 153).

200. Meadowlark. Sturnella magna magna (*Linn.*). (501)

Synonyms: Common Lark, Old Field Lark, Field Lark, Marsh Quail.—Alauda magna, Linn. 1758, Wilson, 1811.—Sturnus ludovicianus, Bonap., Nutt., Aud.—Sturnella magna, Baird, Allen, Ridgway, Brewster, and most American writers.

Plate XLV and Figure 104.

Recognizable at a glance by the gray-and-brown-streaked upper parts, and the brilliant yellow throat and breast separated by a broad v-shaped black collar. In flight the white outer tail-feathers are conspicuous.

Distribution.—Eastern United States and southern Canada to the Plains. Breeds from the Gulf of Mexico northward.

In Michigan the Meadowlark is widely distributed, being most abundant, however, in the Lower Peninsula and occurring only in the most favorable spots in the Upper Peninsula. We have records from Beaver Island in Lake Michigan, Mackinac Island at the head of Lake Huron, and Neebish Island in the St. Mary's River, as well as from Chippewa, Mackinac, Luce, Alger, Marquette, Iron, Dickinson and Delta counties, all in the Upper Peninsula. That it also occurs in favorable localities farther west in the Upper Peninsula is not to be doubted, but at present we have no data which warrant a positive statement in this respect. Presumably it breeds wherever it is found within our borders.

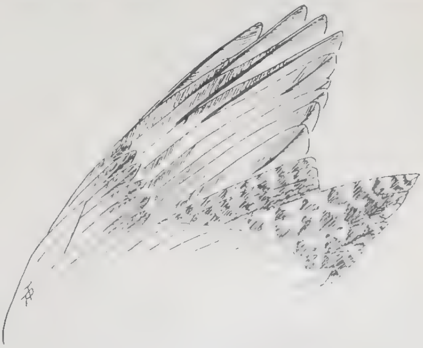

Fig. 104.
Wing of Meadowlark, showing elongated tertiaries.

It is one of our first birds to arrive from the south, in fact, a few individuals always winter in favorable places in the southern part of the state, and in mild winters considerable numbers remain. The northward movement always begins early in March if not before, but the records for the southern part of the state are of course vitiated by the fact that some of the birds have wintered there. At Lansing the first arrivals range from March 3 to March 28, and probably an average date for the center of the Lower Peninsula would be March 12. Often they come in small flocks, but these are seldom compact and the birds are soon found everywhere, in pairs or singly, or occasionally in little parties of three to five.

Nest building begins early in May and fresh eggs may be found at almost any time after the 10th of that month in southern Michigan, and from ten days to two weeks later in the more northern counties. Very commonly, if not usually, a second nesting takes place in July, and it is not uncommon to find young birds barely able to fly late in August. The nest is always placed on the ground, sometimes in the side of a tussock or bank, but more often on the level ground in some neglected field, pasture or meadow, where the dead grass is somewhat long. It is always well concealed, and not infrequently is approached by a covered tunnel or run, sometimes extending two feet or more from the nest. The nest itself is composed almost entirely of grasses, and the eggs are commonly five or six, occasionally four or seven. They are variously marked with brown, purple and lavender dots and lines on a nearly white ground color. Sometimes the spots are very few, and rarely the eggs are thickly spotted. They average 1.10 by .78 inches. Incubation is said to last fifteen or sixteen days.

The song of the Meadowlark is hardly more than a prolonged call-note, yet it is so sweet and clear that when first heard after the long silence of winter it is one of the most attractive of bird calls. Bendire writes the song "hee-hee-hee-thee-hea" and gives the call-note or alarm-note as "eeck-eeck, ending with a tremulous quaver."

From the standpoint of the agriculturist the Meadowlark has few rivals; in fact, we do not know that it has a single bad habit. It feeds almost entirely upon insects, grass-seed and weed-seeds, rarely eating grain of any kind and probably never taking sprouting grain or grain from the head or shock. Moreover, the insects consumed are nearly or quite all injurious forms. It eats moths, grasshoppers, crickets, spiders, cut-worms, caterpillars, and a variety of other insects, but is partial to the forms which are so constantly present in pastures and meadows, working upon the vegetation in such places that it is impossible for the farmer to destroy them. This bird by no means confines itself to the naked span-worms and other larvæ which most other birds eat, but it devours with equal avidity the hairy caterpillars which few birds will touch. In Illinois, in the summer of 1880, Professor Forbes found that the Meadowlarks ate the chinch bug "in barely sufficient numbers to show that they have no unconquerable prejudice against them."

It is much to be regretted that the bird is large enough to make an attractive mark for the would-be sportsman and the small boy, for it is followed up relentlessly and shot for food or for "sport" in spite of the protective law which absolutely forbids its destruction at any time, but which unfortunately is seldom enforced. The Meadowlark is not naturally shy or suspicious and wherever it is rigidly protected for a few seasons it becomes familiar and even confiding, nesting readily in close proximity

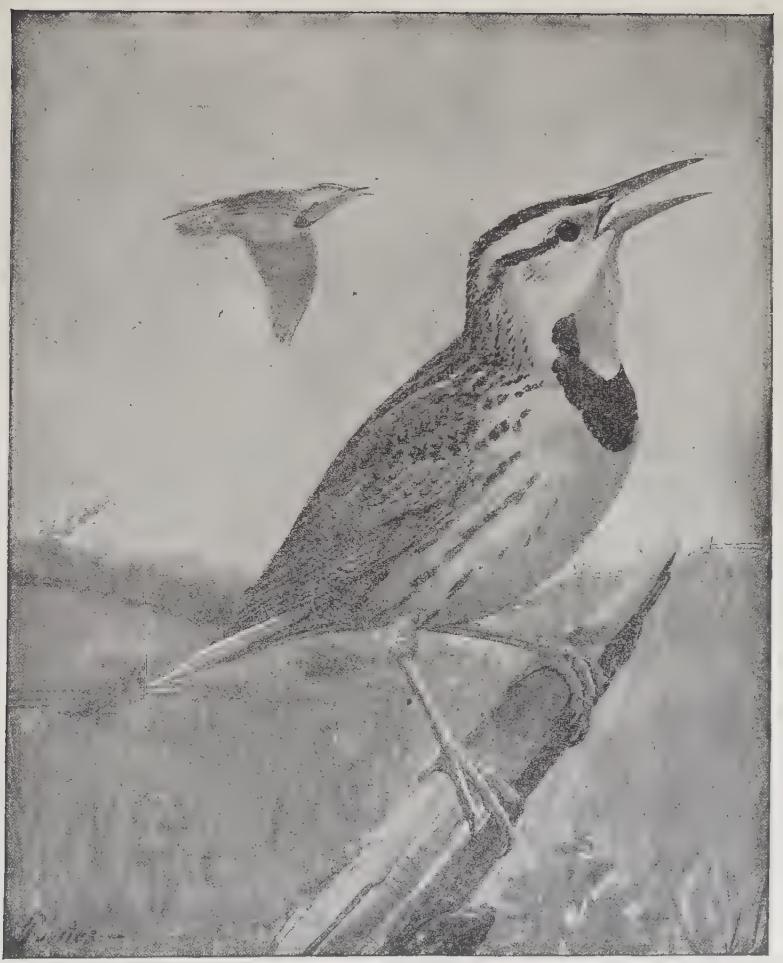

Plate XLV. Meadowlark.

Courtesy of National Committee of Audubon Societies.

to travelled roads, and even in parks and on lawns wherever it finds itself safe from persecution. Its beautiful plumage, attractive notes, and great economic value commend it alike to all classes and situations and it should be most rigidly protected and encouraged.

TECHNICAL DESCRIPTION.

Adult male: Upper parts mainly black, streaked, spotted, and imperfectly barred with grayish-brown; crown mainly black, with a median whitish stripe; a similar light stripe runs backward from the eye, with a narrow black stripe below it, dividing it from the cheeks and auriculars, which are also grayish white; a bright yellow line from nostril to eye; chin, throat, breast, belly and bend of wing, rich yellow, the yellow of the throat not extending laterally onto the malar region; chest with a conspicuous black crescent separating the yellow of throat and breast; sides and flanks heavily streaked with black and grayish-white; two or three outermost pairs of tail-feathers pure white on inner webs; bill brown, horn-colored at base; iris brown.

Adult female: Smaller and duller, the black above not so deep, and the yellow of throat and breast paler. Young birds resemble the female, and for a time show no black collar, or only a series of black spots there. In autumn all specimens have the black and yellow markings much veiled or overlaid by the broad ashy tips and margins of the feathers; these wear off almost entirely before the breeding season.

Male: Length 9.50 to 11 inches; wing 4.40 to 5; culmen 1.20 to 1.52. Female: Length 8 to 10 inches; wing 3.95 to 4.30; culmen 1.04 to 1.17.

201. Western Meadowlark. Sturnella neglecta *Audubon.* **(501b)**

Synonyms: Common Meadowlark, Field Lark, or Lark, of the West.—Sturnella neglecta of Aud. and most authors until about 1870.—Sturnella magna neglecta of most recent writers.

So similar to the eastern Meadowlark as to be separable with difficulty except by the expert. The western form is decidedly paler both above and below, having a peculiar bleached appearance, which, however, is also found sometimes in specimens of the eastern form when in worn plumage. In size the two forms are nearly alike, but the western form averages a little larger.

Distribution.—Western United States, from Wisconsin, Illinois, Iowa, Texas, etc., west to the Pacific Coast and north to British Columbia and Manitoba, south through central and western Mexico.

The only unquestioned record of this species for the state is that of a pair seen near Palmer, Marquette county (Upper Peninsula), on May 10, 1894, by Mr. Oscar B. Warren. One of these birds was secured and the skin is now in the College collection. The species has been reported at various times by different observers in widely separated parts of the state, but we have no specimens to confirm any of these observations and it seems almost certain that the birds reported by Dr. Atkins from Ingham county, and by Covert from other parts of the state, were simply ordinary eastern Meadowlarks in somewhat unfamiliar plumage.

Similar as the two forms are in plumage and general habits, they differ remarkably in song. The present species, on its natural nesting grounds west of the Mississippi, has a beautiful warbling song, suggesting somewhat that of the Baltimore Oriole, but much more prolonged and sometimes almost rivalling that of the Rose-breasted Grosbeak. Even the imperfect autumnal song, which the writer has heard many times on the Minnesota prairies in September, is utterly unlike anything which the eastern bird ever produces, and it would seem impossible that the two birds could be confounded if one were familiar with their songs.

It is very desirable that someone should search for the Meadowlark in the western part of our Upper Peninsula, and if colonies can be found, should study them carefully and publish the results. At present we do not know that either species occurs in this territory, yet from the fact that the western form is not uncommon in northern Wisconsin it seems likely that it may frequently enter adjoining Michigan territory.

The nesting habits and eggs are entirely similar in the two species, but the eggs of the western form average slightly larger and rather more sparsely marked.

TECHNICAL DESCRIPTION.

Adult male: Upper parts mainly dark brown, streaked, spotted and barred with grayish, thus giving a lighter and grayer tone to the plumage; tertiaries and middle tail-feathers distinctly barred with black and grayish, the latter color reaching the shaft, not merely indenting or scalloping the black as it does in the eastern Meadowlark; under parts similar to those of the eastern form, but the yellow somewhat paler, and that of the throat extending laterally more or less over the malar region; flanks and under tail-coverts nearly white—not buffy. The sexual and seasonal differences are parallel with those of the common form.

Male: Wing 4.85 to 5.30 inches; culmen 1.20 to 1.36. Female: Wing 4.30 to 4.60 inches; culmen 1.10 to 1.22.

202. Orchard Oriole. Icterus spurius (*Linn.*). (506)

Synonyms: Brown Oriole, Basket-bird.—Oriolus spurius, Linn. 1766.—Oriolus mutatus, Wilson, 1808.—Pendulinus spurius, Cassin.—Icterus spurius of most authors.

Adult male mostly deep black, the breast and belly rich chestnut brown; no pure white anywhere. Female yellowish olive above and olive-yellow below, with two white wing-bars.

Distribution.—Eastern United States, north to the southern portions of New England, New York, Ontario, Michigan and North Dakota, west to the Plains, south in winter to northern Colombia. Breeds throughout its United States range.

In Michigan the Orchard Oriole is a resident from May to September in most of the southern half of the state. It seems to be a fairly common bird in suitable localities as far north as Grand Rapids and Port Huron, or about to the parallel of 43°; farther north than this it is decidedly uncommon and probably the Saginaw-Grand Valley forms the northern limit of its distribution. Mr. Newell A. Eddy of Bay City records a single specimen from Kawkawlin, in Bay County about ten miles north of Bay City, the only record for the county. At Goodrich, in the southeastern part of Genesee county, Mr. Samuel Spicer reports it common and nesting.

This oriole arrives from the south at about the time the apple blossoms open, the dates ranging from May 6 or 7 at Petersburg and Ann Arbor to May 19 or 20 at Lansing and Grand Rapids. It is everywhere much less common than the Baltimore Oriole, but shows decided preferences for some localities. Thus, about Lansing an entire season may pass without the record of a single Orchard Oriole and it is never common, while along the western shore of Lake St. Clair and St. Clair River, in Macomb and St. Clair counties, Swales and Taverner call it a fairly abundant summer resident.

Its song, according to Bendire, is quick, hurried and impossible to describe, but reminds one somewhat of the Warbling Vireo, but is louder and clearer. In Michigan the song always seems to have a peculiar wiry, metallic twang which suggests the introductory notes of the Bobolink's song. Bicknell notes the fact that it sings regularly on the wing and "passes with uninterrupted song from tree to tree." It is most often seen searching for insects among the terminal sprays of blossoming trees.

It seldom visits the ground, and, at least while with us, its food consists mainly of insects. It is very fond of plant-lice, small caterpillars, and the flies and wasps found about blossoms. According to Bendire it also eats beetles, rose-bugs, grasshoppers and cabbage worms, as well as "larvæ of all kinds." Two specimens were killed in an orchard overrun with canker worms in Tazewell County, Ill., in 1881, and the contents of their stomachs studied by Professor S. A. Forbes. He found that nearly four-fifths of their food was cankerworms, while other caterpillars formed all but three percent of the remainder, this being ants. Butler states that in Indiana when the young leave the nest the whole family go into the corn-fields and feed upon the insect enemies of the corn.

It feeds sparingly on fruits, mainly wild varieties. It also, like the Baltimore Oriole, probes flowers for insects and possibly for nectar, and seems to pinch off and eat stamens quite freely, but since the species is not abundant, this work, as well as the work on small fruits, may be entirely disregarded.

Its nest, unlike that of its nearest relative, the Baltimore Oriole, is seldom completely pensile; although deeply cup-shaped and basket-like, it is most often attached to twigs at the sides as well as at the rim, so that it never swings freely. It is most often found in orchard trees, but the bird is not very particular and sometimes selects oaks, elms, cottonwoods, maples, hackberries, and even occasionally the red cedar or pine. The nest is seldom placed at any considerable height, usually from eight to twenty feet above the ground. The material is almost invariably slender grass, which is commonly used green and often retains this color for months afterward. It is woven and fastened with the same skill possessed by other species of the family and forms a neat and remarkably durable nest. The eggs are from four to six, usually five, bluish-white, spotted and pen-scratched with brown, purple and lavender. They average .79 by .57 inches. The nest is seldom built before the last week in May, and in Kalamazoo county fresh eggs were taken by Westnedge and Syke at various times from May 27 to June 11. Dr. R. H. Wolcott records a nest with young at New Baltimore, Macomb county, July 20, 1893.

TECHNICAL DESCRIPTION.

Bill conical, acute, slightly down-curved toward the end; tail shorter than wing, slightly graduated, the lateral feathers less than half an inch shorter than the middle pair.

Adult male: Entire head, neck, anterior half of back, scapulars, throat and chest, deep black; breast, belly, under tail-coverts, sides, lesser and middle wing-coverts, lower back, rump and upper tail-coverts, rich deep chestnut; greater wing-coverts black, narrowly tipped with whitish; tail black; bill black above, horn-blue at the base of lower mandible; iris pale brown.

Adult female: Yellowish olive above, brightest on head and rump, grayer or browner on back and scapulars; wings with two whitish bars; under parts light greenish-yellow; no chestnut anywhere. Young: At first like the female, but the second season the young male has the lores, chin and throat deep black, and frequently a few black or chestnut feathers here and there. Probably three years are necessary for the attainment of full plumage.

Length 6 to 7.25; wing 2.90 to 3.25; tail 2.65 to 3.20.

203. Baltimore Oriole. Icterus galbula (*Linn.*). (507)

Synonyms: Golden Robin, English Robin, Hang-bird, Hang-nest, Fire-bird, Pea-bird, Hammock-bird.—Coracias galbula, Linn., 1758.—Icterus baltimore of many authors.

Figures 105, 106.

Adult male mainly orange-yellow and black, the latter restricted mostly to the head, tail and wings; wings with two imperfect white bars. Female much duller yellow, with little or no clear black, decidedly smaller than the male.

Distribution.—Eastern United States, north to Ontario and Manitoba, west nearly to the Rocky Mountains, south in winter through Mexico to Colombia.

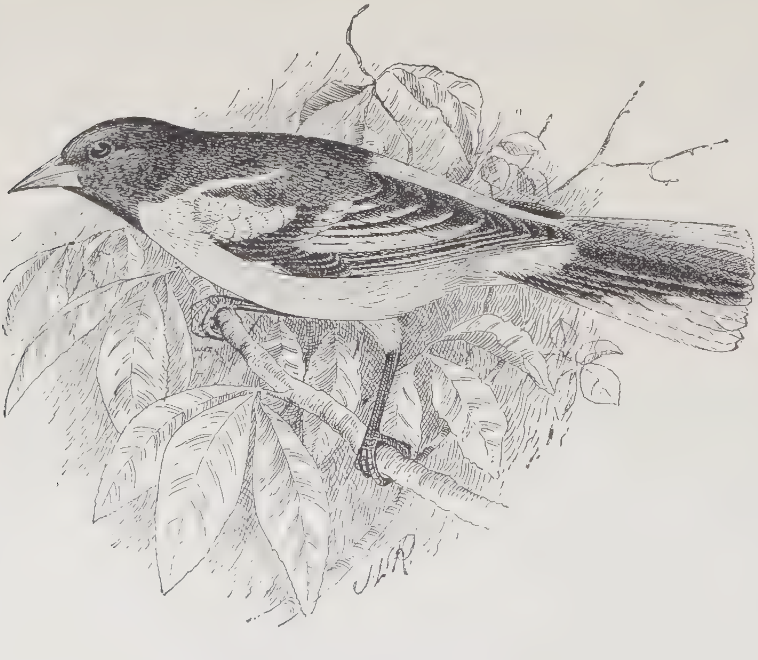

Fig. 105. Baltimore Oriole. Adult Male.
From Yearbook of U. S. Department of Agriculture, 1895.

This is a common visitor to the greater part of the Lower Peninsula, but occurs in abundance only south of latitude 44°, and apparently is absent altogether from most of the Upper Peninsula. It is reported as not common at Van's Harbor, Delta county, which appears to be the northernmost record for the state. This distribution is somewhat singular, since the bird is common in Minnesota as far as Leach Lake, latitude 47°, and is fairly common in parts of Manitoba.

It reaches Michigan from the south late in April or early in May, the dates ranging from April 19, 1889 to May 2, 1893 at Petersburg, Monroe county, and from April 19, 1896 to May 11, 1885 at Lansing. The males come first, as is usual with birds of this family, the females following from five to ten days later. Ordinarily the species first becomes abundant at the time the apple trees are coming into full bloom. Almost immediately on the arrival of the females nest-building begins and most nests are completed and contain eggs by the first of June. Dates for fresh eggs in Kalamazoo county are May 21, 1887, June 1 and 2, 1891, June 8 and June 11, 1888. On the College campus the young almost invariably leave the nest between June 18 and 30, the great majority between the 20th and 25th.

Before the middle of July both old and young have disappeared from garden, orchard and park, and except for an occasional almost silent individual at rare intervals, none are seen again until about the middle of August, from which time until their departure for the south in September they are fairly common and the male frequently sings almost as sweetly as in May. This disappearance for a month or more is rather apparent than real, for a careful search of the woods and swamps will reveal a fair number of orioles, spending most of their time, however, in the leafy crowns of the higher trees, where they are hardly visible, and being almost silent are pretty sure to be overlooked. They may also be found at this season about wild cherry and service berry trees, feeding on the ripening fruit.

The nest is a purse-shaped net of plant fibres, twine, roots and hair, varying in size and depth, but usually fastened by its upper border to several drooping twigs on the hanging branch of some large tree, preferably an elm, oak, or birch, although nests are seen occasionally in a dozen other kinds of trees. These nests are so firmly fastened and so durably woven that not infrequently a nest lasts for several years, although the builder never uses the same nest for more than a single brood. The bird appears to return year after year to the same tree, and often to the same branch, and sometimes two or even three nests built in consecutive years may be seen on the same branch in winter. The eggs are pale bluish-white or rosy-white, spotted, streaked and pen-scratched with black and brown, mostly at the larger end. They average .91 by .61 inches. The set usually consists of four, but often five are found and rarely six. The period of incubation is about fourteen days.

Captain Bendire says of its song: "A very peculiar note, a long drawn out chattering 'chac, chac, chac' is apt to draw ones attention to it on its first arrival, and this is more or less frequently uttered throughout the season. This note is difficult to reproduce exactly, and I find its song still more so. One sounds somewhat like 'hioh, hioh, tweet, tweet;' another something like 'whee-he-he, whee-he-he, oh whee-he-he-woy-woy.' This last is much more softly uttered than the first."

The food of the oriole has a wide range, but consists mainly of insects, at least while with us. It is true that it has a special fondness for green peas, sometimes stripping the pods so freely as to cause considerable complaint. It also punctures ripening grapes whenever it has opportunity, but particularly where vines have run up into trees or over arbors or shrubbery in such a way as to hide the bird while at work. It is rare to hear complaints from grape growers, for where the vines are numerous and properly pruned the Oriole seldom injures them. Occasionally it attacks early apples and pears, digging holes into the soft pulp and of course ruining each apple attacked. This work, however, is often carried on in conjunction with several other birds, notably Red-headed Wood-

Fig. 106.
Bill of Baltimore Oriole.

peckers, Robins, and Blue Jays, while Catbirds and occasionally Bronzed Grackles, take a hand in the work.

On the other hand, the good work done by the Oriole in the consumption of harmful insects can hardly be overestimated. The examination of 113 stomachs in the Division of Biological Survey, U. S. Department of Agriculture, reveals the fact that more than 83 percent of the food of the year consists of animal matter, almost all of which is insects. Of this material the most important item is caterpillars which form more than 34 percent of the whole. Next come beetles, among which the snapping-beetles, of the family Elateridæ, whose larvæ are known as wire-worms, seem to be preferred. May-beetles are also eaten greedily and the destructive leaf-beetles (Chrysomelidæ) usually avoided by birds, seem also to be a favorite food. Weevils are often taken, and wasps, ants and bees are consumed in some numbers. Perhaps the most interesting item in this connection is the fact that the Oriole eats considerable numbers of scale insects (Coccidæ) and plant-lice (Aphidæ), two of the most destructive families of insects known. These are so minute that it is remarkable the birds should eat them, but any one who has watched the Oriole gleaning among the opening buds of apple trees will realize that a single bird must destroy thousands of plant-lice daily. Forbes found that it ate canker-worms freely in Illinois, and Trimble, in New Jersey, found the wing-covers of the plum-curculio in its stomach. It has been noted also by many different observers that the Baltimore Oriole feeds freely on the apple-tree tent caterpillar, tearing open the silken web in order to reach the young insects and returning again and again to feast upon them. The writer has watched the bird thus employed in Massachusetts, Connecticut, New York and Michigan. Not a few grasshoppers and locusts are eaten also, but it must be remembered that almost all the Oriole's food is gleaned from trees, and that it seldom searches for food on the ground. On the whole, it is one of our most valuable, as well as most beautiful birds, and the little harm done is more than compensated by the blessings conferred in the destruction of insects.

"Added to these good qualities, its brilliant plumage, sprightly manners, pleasing song, and skill in nest-building excite our admiration. Let the farmer continue to hold his good opinion of the Oriole and accord to it the protection it so well deserves." (Beal.)

TECHNICAL DESCRIPTION.

Bill much stouter than that of Orchard Oriole; conical, acute, slightly if at all decurved; tail but slightly graduated.

Adult male: Upper parts from bill to middle of back, including scapulars, glossy black, this color covering neck, chin and throat, and usually extending downward on the middle of the chest; rest of under parts rich orange or deep yellow (very variable), brightest on the chest; wings mainly black, with a single white bar across tips of greater coverts, the tertiaries margined with white, and the lesser coverts (shoulders) bright orange; tail yellow at base and tip, each feather with a broad area of black in the middle, most on the middle feathers and least on the lateral pair; bill and legs horn-blue; iris pale brown. In late summer, after moulting, the white wing-markings are wider and much more conspicuous.

Adult female: Rather smaller than the male and otherwise very different. Upper parts dull brownish yellow, more or less mottled or obscurely spotted on head and back with blackish; chin and middle of belly whitish; rest of under parts dull yellow, often with obscure dusky markings on throat and chest; wings grayish-brown with two white bars; tail greenish yellow without black markings. Young: Similar to female, but young males acquire the color pattern of the old male (but not the brilliance) in the second year.

Length 7 to 8.15 inches; wing 3.50 to 3.90; tail 2.85 to 3.35.

204. Rusty Blackbird. Euphagus carolinus (*Mull.*). (509)

Synonyms: Rusty Grackle, Thrush Blackbird.—Turdus carolinus. Müller, 1776 —Scolecophagus ferrugineus, Sw. & Rich., Baird, Coues, and many of the older naturalists. —Quiscalus ferrugineus, Bonap., Nuttall, Audubon.—Gracula ferruginea, Wilson.—Scolecophagus carolinus, Ridgw., 1885, A. O. U. Check-list, 1886, and most recent authors.

Figures 107, 108.

Male in spring uniform bluish or greenish black; in autumn most of the feathers edged with rusty. Female brownish slate-color in spring, with rusty edgings in autumn. In both sexes the iris is straw-yellow.

Distribution.—Eastern United States, west to Alaska and the Plains. Breeds from Northern New England, northern New York, and northern Michigan [?] northward.

This beautiful blackbird is one of the first spring migrants, entering the state from the south early in March, usually as early as the 10th, and frequently lingering, at least in the latitude of Lansing, until the first or even second week in May. This statement is at variance with reports from several sections of the state, where observers speak of the Rusty Grackle being seen only for a day or two in spring, but making a longer stay in fall. Our own experience at the College during the past seventeen years has been as stated above, the birds appearing at about the same time as the Redwings and lingering, in larger or smaller flocks, for almost or quite two months. Eventually all pass northward entirely out of the state and nest beyond our limits. Statements that this species nests in the Upper Peninsula, or elsewhere in the state, seem to be entirely unwarranted, as not a particle of evidence in confirmation has been obtained. The bird returns to us late in September (Isle Royale, Sept. 15, 1905), or early in October, and lingers until after heavy frost, or often until the ground freezes. Frequently large flocks are found late in November, and stragglers linger into December and even occasionally all winter. At least three times during the last ten years we have known from one to three individuals to remain in the neighborhood of the College all winter, and similar instances have been reported from other parts of the state.

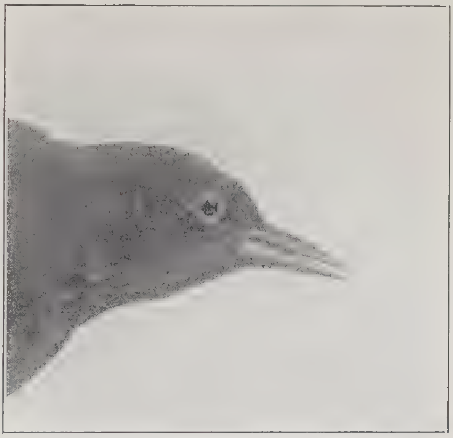

Fig. 107. Rusty Blackbird.
From photograph of mounted specimen.

In the spring the birds are decidedly musical and though a single song, if it can be called such, consists of hardly more than a dozen chuckling and whistling notes, yet a chorus of several hundred birds produces a very pleasing effect. Seton Thompson speaks of them in April as

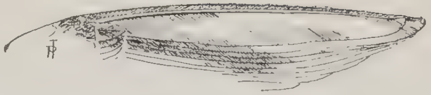

Fig. 108.
Wing of Rusty Blackbird.

follows: "They blacken the fields and crowd the air. The bare trees on which they alight are foliaged by them. Their incessant jingling songs drown the music of the Meadowlarks and produce a dreamy far-away effect as of myriads of distant sleigh bells" (Birds of Manitoba, p. 581). During their spring visit in Michigan the food seems to consist entirely of weed-seeds, waste grain, and such insects and other scraps of animal life as they can pick up in the marshes and around the edges of ponds and streams. They are specially fond of damp places and are continually wading in the shallow edges of pools and streams, apparently never so happy as when their feet are wet. In autumn they frequent stubble fields, corn fields and sometimes the beech woods, feeding on practically the same substances as in spring, though probably with a larger proportion of insects. The examination of 132 stomachs by the Department of Agriculture at Washington shows a larger proportion of animal matter (53 percent) than in any other American blackbird except the Bobolink. They eat immense numbers of water-beetles and their larvæ (which probably have no economic importance), but they also eat snout-beetles, leaf-beetles, May-beetles and numerous other Coleoptera, most of which are harmful. In autumn grasshoppers form a very large part of their food, amounting to nearly 40 percent. They eat but little wheat, oats or corn, except waste in the fields, and it is not probable that they pull up sprouting grain, although this has been alleged. On the whole this species is at least as beneficial as harmful, and probably has a large margin to its credit on the beneficial side.

As already stated, it is not known to nest within our limits, and the only record at hand of a nest in this latitude is the statement that one was found at Storr's Lake, near Milton, Wisconsin, in June 1861 (Kumlien and Hollister, Birds of Wisconsin, p. 89). We are also informed by Mr. F. C. Hubel of Detroit, that he and Mr. Kay found a pair feeding young, near Cobalt, Nipissing district, Ont., in the summer of 1905. According to Job it breeds abundantly on the Magdalene Islands, in the Gulf of St. Lawrence, where it nests like the Robin, "low down in spruces, usually near the ends of thick boughs" (Auk, XVIII, 1901, 200).

The eggs are described by Bendire as light bluish-green, blotched and spotted with different shades of chocolate and chestnut-brown and lighter shades of ecru, drab and pearl-gray. The eggs are four or five in a set, and average .99 by .73 inches.

TECHNICAL DESCRIPTION.

Adult male: In spring, glossy greenish black all over, sometimes (usually) with very narrow whitish or rusty edgings on a few feathers, particularly the under tail-coverts; in autumn, black, all the feathers of the forward half of the bird margined more or less strongly with buff, rusty, or chestnut, most heavily on the top of head amd interscapular region; bill and feet black, iris straw-yellow.

Adult female: In spring, uniform slate-color, with scanty buffy or rusty edgings, which are remnants of the winter plumage; in autumn, similar, but with the slate-color overlaid on head, breast and back with rusty brown or even chestnut; often a conspicuous light stripe extending backward from above the eye. Young are similar to the adult female at first, but the males soon show much blacker wings and tail.

Length 8.20 to 9.75 inches; wing 4.25 to 4.75; tail 3.65 to 4.20; culmen .70 to .80.

205. Bronzed Grackle. Quiscalus quiscula æneus (*Ridgw.*). (511b)

Synonyms: Grackle, Crow Blackbird, Big Blackbird, Western Crow Blackbird.—Quiscalus æneus, Ridgway, 1869.—Quiscalus versicolor, Aud., Swains, Baird (part).—Quiscalus purpureus æneus, Coues, Brewster and others.—Quiscalus quiscula æneus, Stejn., A. O. U. Check-list, 1886, and most recent authors.

Plate XLVI and Figure 109.

Largest of our blackbirds, and readily known by the changeable blue-purple-green-black, of the head, neck and upper breast, and the metallic bronze or brassy color of the body, the feathers of the back and belly without iridescent bars.

Distribution.—From the Alleghenies and southern New England north to Newfoundland and Great Slave Lake, west to the eastern base of the Rocky Mountains, and south to Louisiana and Texas. In migrations, the southeastern states, except Florida and the Atlantic Coast district south of Virginia.

The Bronzed Grackle arrives from the south early in March, occasionally in the latter part of February, and a few instances are known of individual birds wintering in the state. O. B. Warren states that he once saw them in a protected creek bottom in Albion, Calhoun county, in January, and single ones have been observed about the Agricultural College in December and January. At Petersburg the earliest arrival was March 6, 1897 and the latest March 27, 1885. Near Detroit Swales recorded them on February 24, 1891, and in 1896 not until March 29. In the fall the majority depart in October and early November but a few linger until the latter part of November or even into December.

This species is found almost invariably in flocks except during the nesting season, and even then the nests are often placed in communities and the birds feed in companies of ten to fifty even when gathering food for the young. They are somewhat local in their distribution, being common in some towns and almost or entirely absent in adjoining ones, but the species is widely distributed over the state and occurs in greater or less abundance probably in every county. W. H. Grant found it near Houghton, on Keweenaw Point, in 1904; Norman A. Wood took one on Isle Royale in August of the same year; White found it on Mackinac Island, Major Boies found it on Neebish Island, and several observers have reported it from Marquette county and all the Upper Peninsula counties east of that point.

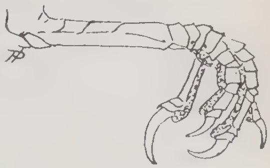

Fig. 109.
Foot of Bronzed Grackle.

Unlike any of our other blackbirds this species nests almost always in trees and at a considerable height from the ground. Its favorite nesting place is in the thick tops or the bushy branches of spruces and other evergreens, but it also places its bulky nest in many of the deciduous trees, and not infrequently in abandoned woodpeckers' holes or in the natural cavities of dead or living trees. We have also seen the nest in vines against the walls of buildings, upon rafters of sheds, the timbers of bridges, and not infrequently on cornices or brackets on large buildings. Dr. R. H. Wolcott also records their nesting in lumber piles at Grand Rapids. We have never seen a nest less than eight feet from the ground, but in the lake regions of Minnesota and Iowa, according to Bendire, they sometimes nest in large colonies in shrubs and wild gooseberry bushes, or even in the reeds, placing the nest sometimes within a foot or two of the ground. It is possible that this may occur in Michigan, but we have been unable to find any record of such a habit.

Ordinarily the nest is very bulky and made of coarse grass, weed-stalks and similar materials, sometimes with a little mud in its composition, more often without. It is lined with finer grass and other fibrous materials, is deeply hollowed, and usually contains five or six eggs, but frequently only four are found and rarely as many as seven or eight. The eggs vary interminably, the ground color ranging all the way from pale greenish-white to light brown, heavily blotched and streaked with brown and purplish. They average 1.18 by .81 inches.

Nesting often begins in March, and in the southern part of the state probably most of the eggs are laid in April. At the Agricultural College young frequently leave the nest before May 20th, but they seem to be maturing from this time on, all through May and June, and we have repeatedly seen young hardly able to fly as late as the 10th of July. It is possible that two broods are reared by some of the birds, but we are inclined to believe that these late broods are due to the loss of a first nest of eggs or young during April or May.

From an economic standpoint the Bronzed Grackle possesses unusual interest. It is extraordinarily abundant over large areas, and has pronounced good habits as well as bad ones. Selecting its nesting places in the shade trees of towns, parks and cemetries, and constantly visiting gardens, lawns, and farms, it has became familiar to almost every one, and its habits have been noticed and criticized. Under these circumstances it is not surprising that the widest difference of opinion exists as to its value. Fortunately the Division of Biological Survey of the United States Department of Agriculture has made an exhaustive study of the stomach contents of this species and the results go far toward settling this vexed question. The writer did a large part of this work himself between the years 1886 and 1890, and the results of this, and additional work by Prof. F. E. L. Beal, were published in Bulletin 13 of the above Division in 1900.

Two thousand three hundred and forty-six stomachs were examined, and of the material contained in these stomachs 30 percent was shown to be animal matter and 70 percent vegetable matter. Insects formed 27 percent of the food for the entire year, while grain formed 47 percent, fruit 5 percent, weed seed 4 percent, and "mast," that is, acorns, chestnuts, beechnuts, and similar material, 14 percent. By far the largest part of the grain consumed is corn and this formed 41 percent of the food in April, 27 percent in May, 28 percent in June, 8 percent in July, 14 percent in August, 53 percent in September, 51 percent in October, and 35 percent in November. Doubtless at least half this corn was of no consequence, being waste grain picked up in the fields or about the farm and roads, but that taken in August and September was mainly corn "in the milk" and caused a direct loss and a serious one to the grower. Wheat, on the other hand, formed about 26 percent of the food in July and August, and in other months less than one percent. This again shows that the bulk of this grain was taken from the harvest field, part of it doubtless from the standing grain and the shock, but much of it from the stubble. Oats formed 14 percent of the food in April, 5 percent in July, 9 percent in August; during the other months the amounts were insignificant. Occasionally

Plate XLVI. Bronzed Grackle.

Reprinted from Chapman's Bird Life, by courtesy of D. Appleton & Co.

the birds pull up sprouting grain, either corn, wheat or oats, and they also pick up any grain left uncovered; but it is during the harvest season, and especially during the time when corn is "in the milk," that their attacks are most important. These facts show conclusively that the Crow Blackbird or Bronzed Grackle is a serious foe to the farmer whenever it occurs in large numbers. Many instances are on record of flocks numbering thousands, or even tens of thousands, which have visited cornfields and grain fields, doing a vast amount of damage in a short time.

The Grackle also eats considerable quantities of fruit at certain times, the figures furnished by stomach examinations being 13 percent in June and 10 percent in July. The fruits most commonly attacked are raspberries, blackberries, cherries, and mulberries, but ordinarily no great damage is done.

One other serious accusation is made against the Grackle, namely, that it robs the nests of other birds, devouring their eggs and young. That this is true to a limited extent is shown both by numerous direct observations and by the stomach analyses. The latter, however, show that remains of eggs and young birds were found in only 37 of the 2,346 stomachs examined, or in less than one stomach in 63. During seventeen summers' observation on the campus of the Michigan Agricultural College, where from fifty to one hundred pairs of these Grackles nest every year, we have but twice seen Grackles robbing the nests of other birds, and very rarely have birds been seen mobbing or attacking the Grackles, which seems to be pretty good proof that they do not regularly pillage the nests of other species.

Turning now to the brighter side of the Grackles character we find that the work which it does in the destruction of insects is of the most interesting and valuable kind. As stated already, 27 percent of the entire food of the year consists of insects, but these are eaten in quantities which vary with the season. Thus in March insects formed 17 percent of the food, in April 25 percent, in May 63 percent, in June 59 percent, in July 45 percent, in August 39 percent, in September 17 percent, and in October 12 percent. As to the kinds of insects eaten, beetles form an important part, and probably the Grackles do a vast amount of good by destroying the mature beetles and the larvæ of the May-beetle or June bug (*Lachnosterna*), which, under the name of "white-grub" is so well known to the farmer as an enemy of grass lands and many cultivated crops. These insects belong to the family Scarabœidæ, and members of this family formed one-fifth of the insect food of the Grackle for May, and one-seventh of the food for June. On the lawns of the Agricultural College it is no uncommon thing in May and June to see fifteen or twenty female Grackles at a time busily searching the turf for these large May-beetles and flying away with one or two at a time to feed their young in the neighboring spruces. On exceptional occasions we have counted as many as sixty of these birds searching for May-beetles and apparently for nothing else. In our opinion the good condition of the college lawns is due very largely to the protection afforded them by these birds. Snout-beetles (weevils or curculios) are also eaten regularly and in considerable numbers, indicating that the Grackles have a special fondness for these insects which are small, hard-shelled, and not particularly attractive to most birds. In one stomach seventeen specimens of the corn-weevil (*Sphenophorus*) were found and in other stomachs fourteen. Grasshoppers formed 19 percent of the food in May and increased in amount regularly until August, when they formed

23 per cent of the food. It is hardly necessary to point out the importance of these facts. Remembering that, especially in August, the blackbirds are feeding in large flocks it is easy to see that at this time they must consume grasshoppers by the million. Caterpillars formed 8 per cent of the food in May and 4 percent in June; not a large amount, but forming nevertheless an important item; many of the caterpillars eaten are cutworms, and among these the army-worm was recognized in six stomachs. The Grackles eat large numbers of spiders, but these probably have small economic significance.

Practically the only harm done in the course of the insect-eating is the destruction of a considerable number of predaceous beetles, ground beetles belonging mainly to the family Carabidæ. The largest percentage of these, 13 percent, was found in June, and this would indicate that the birds were doing some harm, for these beetles feed mostly upon other insects and are therefore potentially beneficial. It must be remembered, however, that these beetles are abundant at all times of the year, that they are conspicuous by their size and activity, and also, being often strong-scented, are not generally eaten by other birds. It is therefore natural that a bird like the Grackle should eat a considerable number of them, especially as the taste and odor do not seem to be disagreeable.

Taken all in all the facts seem to show conclusively that in the long run the Bronzed Grackle is a valuable bird which does considerably more good than harm, but the manner in which this good and evil are distributed makes it impracticable for the average farmer to tolerate the bird invariably. The good done is widely distributed; the harm is often concentrated on a few acres. So long as the birds are but moderately abundant the good done is pretty sure to outweigh the harm, even in the case of the fruit grower, market gardener or small farmer; but when they become superabundant instances of great injury are sure to occur and much complaint will follow. It seems probable that it will be best not to attempt to protect the Grackles by law at present, but to try to teach the farmer to let them alone so long as they are doing no visible harm, only striving to limit their numbers or drive them from his fields when they threaten serious injury.

The Bronzed Grackle is one of the few birds for whose vocal performance little can be claimed. It has nothing which, even by the most imaginative, can be called a song, and its usual love notes have been aptly likened to the creaking of a rusty hinge. In the case of other blackbirds numbers sometimes modify the character of the individual performance so that a chorus is musical, but in the case of the Grackle the larger the number the greater the discord.

TECHNICAL DESCRIPTION.

Adult male: Head and neck all round, metallic black, with purple, violet, blue or green reflections; rest of the body plumage above and below, black, with a distinct brassy gloss, the line between neck and body sharply defined; wings and tail with purplish or violet gloss, never bluish; bill and feet black; iris bright yellow. Adult female: Decidedly smaller and duller, the head and neck not noticeably different, but the body plumage lacking much of the metallic luster. Young: Similar at first to adult females, but even duller, the body plumage mostly slate color, with no metallic reflections; before moving southward, however, the sexes are distinguishable by the plumage.

Male: Length 12 to 13.50 inches; wing 5.45 to 5.95; tail 5.25 to 5.90 (its graduation 1.15 to 1.60); culmen 1.12 to 1.26.

Female: Length 11 to 11.50 inches; wing 5 to 5.25; tail 4.80 to 4.90.

Family 56. FRINGILLIDÆ. Finches, Sparrows, Buntings, Linnets, Grosbeaks, Crossbills and Longspurs.

The largest family of Michigan birds, including not less than 38 species.

KEY TO SPECIES.

Closed tail showing a distinct notch or fork (Fig. 112), that is, middle tail-feathers shorter than lateral feathers. Group 1.

Closed tail rounded or double-rounded (Plate 53), the lateral tail-feathers always shorter than the middle ones. Group 2.

Closed tail square or nearly so (Fig. 114) (sometimes slightly double-rounded), the middle and lateral feathers of about the same length. Group 3.

Group 1.

Closed tail with a distinct notch or fork.

- A. Wing over 4.25 inches. B, BB.
  - B. Wings black, the primaries or secondaries, or both, with large white markings (patches). Evening Grosbeak. No. 206.
  - BB. Wings brownish-black (fuscous), only their coverts white tipped, forming two white wing-bars. Pine Grosbeak. No. 207.
- AA. Wing less than 4.25 inches. C, CC.
  - C. Mandibles with hooked tips which cross each other like scissor blades. D, DD.
    - D. With conspicuous white wing-bars. White-winged Crossbill. No. 210.
    - DD. Without any white in wing. Red Crossbill. No. 209.
  - CC. Mandibles not crossed. E, EE.
    - E. Claw of hind toe twice as long as claw of middle toe. F, FF.
      - F. Hind claw much curved. Snow Bunting. No. 218.
      - FF. Hind claw little curved. Lapland Longspur. No. 219.
    - EE. Claw of hind toe not twice as long as claw of middle toe. G, GG.
      - G. Birds showing more or less bright blue, yellow or red (not brown). H, HH, HHH.
        - H. Marked with red. I, II.
          - I. A conspicuous red cap or crown; chin black. Redpolls. Nos. 211-214.
          - II. Most of plumage washed with red; chin not black. Purple Finch, male. No. 208.
        - HH. Marked with blue, or whole body blue. Indigo Bird, male. No. 242.
        - HHH. Marked with yellow. K, KK.
          - K. Yellow mainly on head and body plumage; none on wings or tail. Goldfinch. No. 215.
          - KK. Wings and tail with more or less yellow, head and body without. Pine Finch, Siskin. No. 216.

- GG. Birds without any bright blue, yellow, or red. L, LL.
  - L. Streaked below. M, MM.
    - M. Broadly and strongly streaked; wing over 3 inches long. Purple Finch, female. No. 208.
    - MM. Narrowly and often faintly streaked; wing less than 3 inches. Indigo Bird, female. No. 242.
  - LL. Without streaks below. N, NN.
    - N. A dusky spot in middle of breast. Tree Sparrow. No. 230.
    - NN. No dusky spot in middle of breast. O, OO.
      - O. Crown with a distinct median stripe. Clay-colored Sparrow. No. 232.
      - OO. Crown without median stripe. P, PP.
        - P. Bill black. Chipping Sparrow. No. 231.
        - PP. Bill reddish yellow. Field Sparrow. No. 233.

Group 2.

Closed tail rounded or double-rounded.

- A. Larger, wing over 2.75 inches. B, BB.
  - B. Plumage with more or less red or yellow. C, CC.
    - C. Breast yellow, no red anywhere. Black-throated Bunting. No. 243.
    - CC. Breast not yellow. D, DD.
      - D. Head crested, mainly red, no white on wings or tail. Cardinal, male and female. No. 240.
      - DD. Head not crested, nor red; some white on wings or tail. E, EE.
        - E. A yellow spot in front of eye. White-throated Sparrow. No. 229.
        - EE. No yellow spot in front of eye, under wing coverts rose red or lemon yellow. Rose-breasted Grosbeak, male and female. No. 241.
  - BB. Plumage without red or yellow. F, FF.
    - F. Outer tail-feathers with much white. G, GG.
      - G. Breast narrowly streaked with blackish. Vesper Sparrow. No. 220.
      - GG. Breast not streaked. H, HH.
        - H. Breast black or brown, sides bright brown. Chewink, male and female. No. 239.
        - HH. Breast whitish with a small central patch of blackish spots. Lark Sparrow. No. 226.
    - FF. Outer tail feathers without white. I, II.
      - I. Upper parts mainly rust red. Fox Sparrow. No. 238.
      - II. Upper parts without rust red. J, JJ.
        - J. Crown milk white or with a median light buff stripe. White Crowned Sparrow. No. 228.
        - JJ. Crown black or blackish without median light stripe. Harris' Sparrow. No. 227.

- AA. Smaller, wing 2.75 or less. K, KK.
  - K. Streaked above and below. L, LL.
    - L. Crown with a distinct median light stripe. M, MM.
      - M. Smaller, wing barely 2 inches. Leconte's Sparrow. No. 224.
      - MM. Larger, wing always more than 2 inches. N, NN.
        - N. Tail short, barely 2 inches. Henslow's Sparrow. No. 223.
        - NN. Tail long, 2.25 to 3 inches. O, OO.
          - O. Chest white, broadly streaked and spotted with brown or blackish, usually with a central dark patch. Song Sparrow. No. 235.
          - OO. Chest gray or buff with narrow or indistinct dark streaks and no central dark patch. P, PP.
            - P. Chest gray or brownish gray with broad indistinct streaks. Swamp Sparrow. (young). No. 237.
            - PP. Chest buff with distinct narrow streaks of blackish. Lincoln's Sparrow. No. 236.
    - LL. Crown without distinct median light stripe; tail feathers acute. Nelson's Sparrow. No. 225.
  - KK. Streaked above, but plain below. Q, QQ.
    - Q. Bend of wing and spot above eye yellow, crown without chestnut. Grasshopper Sparrow. No. 222.
    - QQ. No yellow on bend of wing or above eye, forehead black, crown chestnut. Swamp Sparrow (adult). No. 237.

Group 3.

Closed tail square or nearly so.

- A. With more or less blue in plumage. Indigo Bird, male. No. 242.
- AA. Without blue. B, BB.
  - B. With more or less bright yellow. C, CC.
    - C. Only bend of wing and streak over eye yellow. Savanna Sparrow. No. 221.
    - CC. Breast yellow. Black-throated Bunting. No. 243.
  - BB. Without yellow. D, DD.
    - D. Outer (lateral) tail-feathers largely white. E, EE.
      - E. Upper parts and breast slate-colored, not streaked, bill white or pink. Junco. No. 234.
      - EE. Upper parts and breast streaked with light and dark, bill dusky. Vesper Sparrow. No. 220.
    - DD. No white in the tail. F, FF.
      - F. Upper parts distinctly streaked; wing more than 2.75 inches. English Sparrow. No. 217.
      - FF. Upper parts indistinctly or not at all streaked; wing less than 2.75 inches. Indigo Bird (female). No. 242.

206. Evening Grosbeak. Hesperiphona vespertina vespertina (*Coop.*). (514)

Synonyms: Sugar-bird.—Fringilla vespertina, W. Cooper, 1825.—Coccothraustes vespertina, A. O. U. Check-list, 1886.—Hesperiphona vespertina of most recent authors.

Figure 110.

The male is a striking bird with immense bill, with black and white and old gold plumage, the yellow and black passing into each other through all the shades of brown, olive and buff. The female is largely drab-gray or ashy with little or no yellow and more white in the wings and tail.

Distribution.—Western British Provinces, east to Lake Superior and casually to Michigan, Ohio, Ontario, New York and New England.

The Evening Grosbeak is doubly interesting to Michigan bird lovers not only because it is a rare and beautiful bird, but because the first specimen known to science, the type from which the species was described, was taken near Sault Ste. Marie, Mich., in April, 1823, by Schoolcraft, and described by Cooper, in January, 1825, under the name *Fringilla vespertina,* the specific name given apparently under the belief that the bird sang oftenest or best at evening. As a matter of fact, the song appears to be the least interesting of its characteristics, nor does it appear to sing better or more frequently at evening than at other times. Mr. Stewart E. White, who observed these grosbeaks carefully at Grand Rapids from March 5 to May 14, 1890, says of their song: "The males have a single metallic cry like the note of a trumpet, the females a loud chattering like the large Cherry Birds (*Ampelis garrulus*)." This was in March, but on April 14, just before they withdrew to their summer home, Mr. White adds, "Their song now is a wandering, jerky warble, beginning low, suddenly increasing in power, and as suddenly ceasing as if the singer were out of breath" (Auk, Vol. IX, 1892, p. 245).

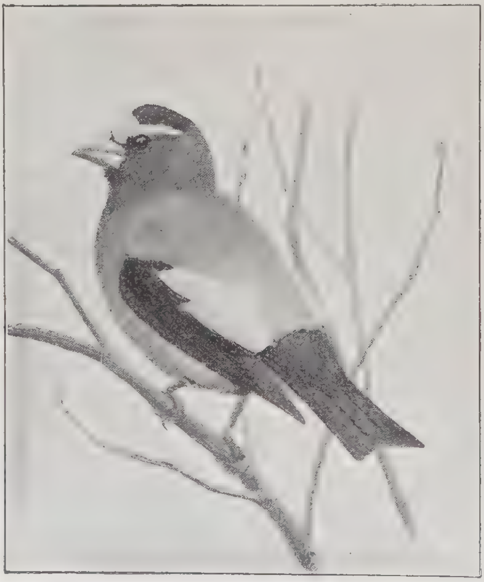

Fig. 110. Evening Grosbeak. Adult.
From North American Fauna No. 16. Biological Survey, U. S. Department of Agriculture.

It may be objected that this was not nesting time and the locality not home. However, J. K. Townsend, who studied this bird along the Columbia River in May 1836, wrote for Audubon's work the following account of the call-note and song. "It is stated that they are retiring and silent during the day and sing only at the approach of evening. Here they are remarkably noisy during the whole of the day from sunrise to sunset. They then retire quietly to their roosts in the summits of the tall pines and are not aroused until daylight streaks the east when they come forth to begin as before. * * * Their ordinary voice when they are engaged in procuring food, consists of a single rather screaming note, which from its tone I at first supposed to be one of alarm, but soon discovered my error. At other times, particularly about midday, the male sometimes selects a lofty pine branch, and there attemps a song; but it is a miserable failure. The note is a single warbling call, exceedingly like the early part of the Robin's song, but not so sweet, and checked as though the performer were out of breath. The song, if it may be called such, is to me a most wearisome one. Am constantly listening to hear the stave continued and am as constantly disappointed (Bull. Nutt. Orn. Club, IV, 1879, pp. 70-71).

As intimated already, the Evening Grosbeak is merely a winter visitor to Michigan, and not a regular visitor at that. Nevertheless, its appearances seem to have become more frequent in recent years, and there is some reason to believe that the species is extending its range eastward and may eventually become a regular winter resident of the state. After its discovery in 1823 it does not appear to have been noted in the state until 1869, when Dr. Morris Gibbs met with it at Kalamazoo. He also noted it there in 1872, 1873, 1874, 1878 and 1879, sometimes singly and sometimes in flocks. It was reported from Albion in the spring of 1886 by O. B. Warren, and near Brighton by A. B. Covert in December of the same year. In 1887, Mr. N. A. Eddy of Bay City reported it, and during the winter of 1889-90 it was reported very generally from all over the Lower Peninsula. In 1893, P. A. Taverner found a flock in the city of Port Huron, and it was reported in March, 1897, by Percy Selous at Greenville, and in December, 1899, by W. H. Dunham in Kalkaska county. In April, 1900, Mr. Dunham again reported it in Kalkaska county, and in December of the same year Mr. Melville reported it at Sault Ste. Marie, Mich. In December 1903 it was reported from Presque Isle county by B. H. Swales, and in March 1904 from Mt. Pleasant, Isabella county, by Mr. Newberry, also from Goodrich, Genesee county by Samuel Spicer. Mr. Thomas B. Wyman of Munising, Alger county, reports that a large flock remained on Grand Island in Lake Superior from January 23 until March 14, 1906. And they have reappeared in some numbers each succeeding winter. During the winter of 1908-1909 they were quite generally reported from the northern parts of the state, and there were a few reports the following winter, but the winter of 1910-1911 brought the largest numbers seen in recent years, for they appeared everywhere in flocks, even in the most southern counties of the state.

Mr. Amos Butler thus sums up the eastern extension of this species during the last fifty years: "It is not every winter that these birds cross the Mississippi, and it is unusual when we note their wide distribution east of that river. Michigan appears to be more often visited than any other state noted here. As has been observed, its first recorded extension of range east of Lake Superior was at Toronto, Ont. in 1854; next it was noted from Ohio in 1860; from Ontario again in 1866 and from Michigan in 1869. * * * The first extensive wanderings of the Evening Grosbeak, as far as we know, appear to have occurred in 1871, when they extended south into Illinois and east into Ontario, and in 1879 they were found in localities as far apart as Charles City, Iowa, and Grand Rapids, Mich. In the winter of 1886-87 they were reported from Nebraska, Iowa, Illinois, Kentucky, Indiana, Wisconsin, Michigan, New York, and Ontario. That year they appear to have been most common in the states of Iowa, Indiana and Illinois and the area of eastern North America covered was the greatest known up to that time, but this was very much exceeded by the wide distribution of the species in the winter of 1889-90, when although they do not appear to have been as numerous in some localities as in the last preceding dispersal, they reached nearly to the Atlantic Coast at several localities" (Auk, IX, 1892, 246-247).

During their winter sojourn in Michigan the Evening Grosbeaks feed largely upon the seeds of maple, box-elder, ash, and of various frozen or dried fruits from trees and vines, and frequently upon the seeds of various cone-bearing trees. According to Mr. L. Whitney Watkins, who observed them carefully at Manchester, Mich. during the winter of 1889-90, they preferred apple seeds, taken from frozen apples, to all other food; next they ate maple seeds, and took the seeds of evergreens only as a last resort. Three male grosbeaks which he kept in captivity for nearly two years refused to eat any kind of grain except a few oats when hard-pressed. They also refused to eat insects of any kind that could be procured. Almost all observers agree that the birds are remarkably tame and unsuspicious when they first appear in late autumn or winter, moving about and feeding often in large flocks (very seldom singly) and show little fear of man until after they have been repeatedly shot at or otherwise alarmed. Towards spring, however, and especially toward the end of their stay in April and May, they become more shy and more suspicious and are altogether more restless and uncertain.

The nest and eggs of this species remained unknown until 1901, when they were found at Willis, New Mexico by Francis J. Birtwell, who collected two nests of three and four eggs respectively and lost his life in attempting to collect a third. The nests were of sticks and *Usnea* moss, lined with rootlets, and placed near the tips of horizontal branches of large pines, from forty to seventy feet from the ground. The eggs are described as "in color, size, form, texture and markings, indistinguishable from those of the Red-winged Blackbird." The birds appeared to be nesting in a small colony of a dozen pairs or less.

TECHNICAL DESCRIPTION.

Bill very large, short and strong, nearly as high at base as long. Adult male: Forehead and stripe over eye bright yellow; crown deep black; rest of head and neck all round, dark olive-brown, fading to lighter olive on the back and changing to rich golden yellow on the scapulars and rump; similarly, the dusky olive of the throat fades on the breast and becomes bright yellow on the sides, belly, flanks and under tail-coverts; upper tail-coverts and tail deep black, without spots; primaries deep black; most of the secondaries and their coverts snowy white; the tertiaries rather duller white; bill greenish yellow; iris brown.

Adult female: Top and sides of head brownish or brownish-gray; throat white, bordered on each side by a black or dusky line; breast and sides gray, marked with yellowish, and becoming pure white on belly and under tail-coverts; nape dull yellow, tending to form a collar about the hind neck; back and rump brownish or ashy gray; upper tail-coverts black, tipped with white; tail-feathers black, broadly spotted with white at ends; primaries and secondaries black, boldly spotted with white; lining of wing yellow. Young: Similar to adult female, but duller and more brownish, usually lacking the dark lines at the sides of the throat. Length 7 to 8.50 inches; wing 4.20 to 4.50; tail 2.75 to 3.20; culmen .75 to .80.

207. Pine Grosbeak. Pinicola enucleator leucura (*Mull.*). (**515**)

Synonyms: American Pine Grosbeak, Canadian Pine Grosbeak, Canadian Grosbeak, Pine Bullfinch.—Loxia leucura, Muller, 1776.—Loxia enucleator, Wils.—Pinicola canadensis, Baird, 1858.—Pinicola enucleator canadensis, Ridgw., 1887.

Males vary from rose-pink to dull yellow, according to age, and females are mainly slate-gray with some dull yellow on head, rump and upper tail-coverts. Two conspicuous white or whitish wing-bars at all ages. Bill very stout, but short and small for a grosbeak.

Distribution.—Northern parts of Northern Hemisphere to about the northern limit of trees; south in winter irregularly into the United states east of the Rocky Mountains; breeds mainly north of the United States.

The Pine Grosbeak is a winter visitor to Michigan, coming with some regularity into the northern part of the state, and once in a dozen years perhaps appearing in large numbers and extending its range over the whole of the state. As far south as the latitude of Lansing a few individuals are seen almost every winter, but in the two southern tiers of counties, and particularly in the southeastern corner of the state, it is a comparatively rare visitor. At Ann Arbor Mr. Covert states that it was very common during the winter of 1874-75, and a few specimens were taken in December 1878, but that ordinarily it is not seen. In 1881 it was seen in flocks of thousands in Jackson county, but with that exception is considered rare. At Plymouth, Wayne county, Mr. Purdy took a single bird December 9, 1903, which he says is the only one he ever saw there. Mr. Swales does not consider it common about Detroit, but two were killed near there November 9, 1903, and two more were seen March 6, 1904. They were fairly common at Kalamazoo during the first week in December, 1903, and several specimens were taken. A few are seen almost every winter on the campus of the Agricultural College, Ingham county, and two or three times since 1894 they have been present in large numbers, and from December to March. Occasionally they come from the north in November, and in New England they have been noted repeatedly in October, but as a general rule they do not appear until December or later, and a few instances are known in which they have been absent until February and then have appeared in large numbers.

Though ordinarily seen in flocks, sometimes to the number of one hundred and fifty or two hundred, they also occur singly or in pairs, but these single birds are readily attracted by a whistled imitation of their note and always seem anxious to rejoin others of their kind. Usually they prefer regions where conifers are abundant and much of their food consists of the buds of pine, spruce and tamarack, and of the berries of the Virginia juniper, but they also eat the buds of other trees and are particularly fond of the seeds of maples, the berries of the mountain ash, and a large variety of other berries and seeds. They are quite unsuspicious, allowing a very close approach while feeding, and the writer has frequently taken them alive with a butterfly net or with a noose of wire on the end of a fishing-rod. A great majority of the specimens which we see appear to be young birds, the proportion of old males, as indicated by the rosy color, being seldom greater than one in twenty-five, and not infrequently a flock of fifty or more will not contain a single high-plumaged male.

The call-note is a very clear whistle, repeated two or three times, and resembles somewhat the plaintive note of a lost chicken. On sunny days in winter, especially after an abundant repast on seeds and berries, the male frequently warbles a low, sweet song which somewhat resembles that of the Purple Finch. During the nesting season it is said to have a beautiful warbling song of considerable volume and great sweetness.

The Pine Grosbeak is not known to nest within our limits; in fact, United States nesting records are few, and mainly uncertain. The only suggestion of possible nesting lies in the fact that M'Creary, who accompanied the University of Michigan party to Isle Royale in 1905, found two Pine

Grosbeaks among the balsam firs on August 14, a rather early date for migrants (An. Rep. Mich. Geol. Surv., 1908. Isle Royale, 364). Probably this island, the northernmost bit of Michigan territory, is as favorable a breeding place for this species as any in the state and it is by no means improbable that the grosbeaks may nest there occasionally, or even regularly. It is said to nest in the tops of evergreens, building a structure which is shallow and thin and consists mainly of rootlets. The eggs are three or four, bluish-green, spotted somewhat thinly with brown and black. They average 1.01 by .74 inches. According to Kumlien and Hollister (Birds of Wisconsin, p. 91) this species is said to nest within the boundaries of the Badger State, but they have been unable to substantiate the claim and think it very doubtful.

Aside from the possible distribution of the seeds of valuable trees we know of no benefit which this species confers on the agriculturist. It is, however, almost if not entirely harmless, since the few buds cut from evergreens and shade trees are of little consequence, and the bird is so beautiful and interesting that it deserves protection on this account if for no other.

TECHNICAL DESCRIPTION.

Adult male: Upper parts rose-pink, brightest on head and rump, dullest on interscapular region, where all the feathers have dusky centers; under parts mainly pink, but duller than above, and shading into ashy gray on the flanks and belly; wings and tail slate-color to slaty-black, the tail unmarked, the wings with two white bars and the tertiaries broadly edged with white; bill and feet brownish black; iris brown.

Adult female: General color gray or brownish gray, the head, neck, rump and upper tail-coverts pale greenish yellow to rusty yellow, and the breast and sides often washed with the same; wings and tail as in the male. Young: Similar at first to adult female, but with less yellow, and the wing-bars buffy instead of white. Probably males take more than one year to attain full plumage, and nearly all degrees of coloring occur, from pale yellow through brownish yellow and madder-brown to rose.

Length 8.25 to 9 inches; wing 4.50 to 5; tail 3.70 to 4.45; culmen .53 to .59.

208. Purple Finch. Carpodacus purpureus purpureus (*Gmel.*). (517)

Synonyms: Purple Linnet, Red Linnet, Gray Linnet (immature and female).—Fringilla purpurea, Gmelin, 1789.—Carpodacus purpureus of all recent authors.

Size of the English Sparrow. Adult male mostly rosy red, brighter in summer, duller in winter, the back more or less streaked with dusky. Adult female streaked above with brown and gray, below with dusky and white; likely to be mistaken for a sparrow.

Distribution.—Eastern North America from the Atlantic coast to the Plains. Breeds from middle states northward.

In suitable places throughout the Lower Peninsula north of the Saginaw Grand Valley, as well as in the entire Upper Peninsula, the Purple Finch is a not uncommon summer resident. It haunts the margins of evergreen forests, pours forth its beautiful song from the tops of balsams and junipers along the margins of the Great Lakes and the smaller ponds, and soon after its first arrival in spring may be found frequently in the orchards nipping the buds from pear, apple and cherry trees.

South of the Saginaw-Grand Valley the bird is mainly a migrant or a rare winter resident, but for that matter a few individuals probably winter in all parts of the state. The writer found it common and in full song on Big Beaver Island, Lake Michigan, in July 1904, and also found it fairly common throughout the Upper Peninsula from Marquette eastward to the Sault. Major Boies states that he saw it on Neebish Island in summer feeding on the seeds of the burdock, and Mr. O. B. Warren states that it is abundant and breeds in Marquette county. It has also been recorded by Dr. Wolcott as breeding at Charlevoix in the summer of 1894, and Hazelwood states that it sometimes nests at Port Huron, although he has not taken the eggs. There is a nesting record for Lansing, a bird having built its nest in an evergreen tree in a dooryard in that city. Dr. Gibbs records a set of two eggs taken in Kalamazoo county in 1870, '71 or '72, but is unable to give other data. In St. Clair county both Mr. Taverner and Mr. Swales say that it is rather scarce and irregular, occurring only as a migrant. Even at Lansing, where it is a regular spring visitor, it comes singly and in small numbers in the spring, but occurs in flocks of a dozen or two in October, when it is frequently found feeding on the seeds of various trees, most often perhaps on those of the hornbeam or blue beech.

This is a bird of somewhat doubtful utility, since it has a pronounced fondness for the blossom-buds of fruit trees and a small flock will sometimes nip off nearly all the fruit buds on a good-sized pear tree in the course of a few visits. On the other hand, it eats a good many injurious insects during the summer and is one of our very best singers, its song resembling that of the Canary, and also to a certain extent that of the Warbling Vireo. It is one of the few species which habitually sing on the wing, and an old male in full plumage, floating slowly in a descending spiral and pouring out a perfect flood of melody, makes one of the most attractive experiences which fall to the lot of the bird lover. The males do not acquire the full plumage until at least two years old and many of the yearlings sing and nest while still in the gray plumage. Specimens intermediate in plumage and song are frequently met with, but most breeding pairs are found to consist of a rosy male and gray female.

The nest is usually placed in the top of an evergreen tree (often a red cedar or a balsam fir) at a height of twelve to fifty feet, and is compactly built of grasses, roots and usually some hair, and in the writer's experience is deeply hollowed, although other observers describe it as shallow. The eggs are three or four, greenish blue, speckled and sometimes pen-scratched with brown and black. They average .80 by .57 inches. Both nest and eggs closely resemble those of the common Chipping Sparrow, but of course are decidedly larger.

This is one of the birds which ought to increase in numbers with the settlement and cultivation of the country, but thus far it does not seem to have done so in Michigan; indeed, several correspondents state that the bird is not as common now as formerly.

TECHNICAL DESCRIPTION.

Adult male: General color rosy red, brightest on crown and rump, fading to whitish on lower breast and belly, but usually tinged with red even there; back and wing-coverts mottled red and brown, owing to brownish centers of the feathers; wings and tail dusky or brownish, the wings usually with two distinct reddish bars formed by tips of middle and greater coverts; bill, feet and iris, brown.

Adult female: Without any red; upper parts streaked with gray and olive-brown, the latter predominating; under parts whitish, thickly streaked and spotted with olive-brown; a broad brownish stripe behind the eye, bordered above and below by whitish; wings and tail similar to those of male, but with no reddish edgings, the two wing-bars soiled white. Many young males (perhaps all) wear the plumage of the female until at least a year old, perhaps longer, and they sing freely and breed in this plumage. Adult males in winter are darker and more purplish, but at best the bird is never purple, but rather crimson.

Length 5.50 to 6.25 inches; wing 3.15 to 3.40; tail 2.30 to 2.50. Female slightly smaller than male.

209. Red Crossbill. Loxia curvirostra minor (*Brehm.*). (521)

Synonyms: American Red Crossbill, American Crossbill, Common Crossbill.—Crucirostra minor, Brehm, 1846.—Curvirostra americana, Wilson.—Loxia americana, Bonap.—Loxia curvivostra minor, Ridgw., 1885, A. O. U. Check-list, 1886.

Figure 111.

Size of the English Sparrow; both mandibles curved and crossed at the tip (Fig. 111); no white on the wings. General color brick-red (either dull or bright), greenish-yellow, or brownish-yellow, the rump always either red or yellow.

Distribution.—Northern North America, resident sparingly south in the United States to Maryland and Tennessee in the Alleghanies. Irregularly abundant in winter.

In Michigan the distribution of the Red Crossbill is similar to that of the Pine Grosbeak except that it is more common. In other words it is a frequent winter visitor to most parts of the state, occurring often in large flocks and being most abundant in regions where conifers are plentiful. Unlike the Pine Grosbeak, however, the Red Crossbill often spends the summer in the more northern portions of the state, especially in pine and spruce regions, and it probably nests within our limits not infrequently.

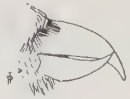

Fig. 111.
Red Crossbill.

It often appears in the middle and southern counties, in flocks of fifty or more individuals in October and November, moving restlessly from place to place, feeding mostly on the seeds of cones and buds of evergreens, but also eating weed-seeds and wild fruits of various kinds. Often it is remarkably unsuspicious, and with care specimens may sometimes be caught in the hand, or more readily with a butterfly net. It is very fond of the seeds of the arbor-vitæ (*Thuja*), as well as those of tamarack and the various spruces, firs and pines, and the peculiar structure and great strength of the bill enable it to tear open the strongest and toughest cones and pick out the nutritious seeds. A flock of a hundred or more of these birds tearing open the cones of the Norway Pine makes noise enough to attract the attention of the most careless observer, and the commotion is increased by the chattering of the birds, which, however, whistle more loudly while on the wing than when at work on the trees.

Although the species is almost universally distributed through the state, it is by no means equally common in all parts, or even in the same place in successive winters. In the southeastern part of the state it seems to be rather rare, while in the central and northern portions of the Lower Peninsula, and much of the upper Peninsula, it occurs in some numbers almost every winter and sometimes in enormous flocks. On the other hand, there have been occasional winters when apparently no specimens were noted in any part of the state.

There has been a vast amount of dispute as to the nesting habits of the Crossbills and the matter can hardly be considered settled as yet. It has long been believed that the species nested in mid-winter, and in fact positive statements to this effect, supported by fairly conclusive evidence, have been published many times. Nevertheless, the birds have been found nesting during the spring and summer, and birds which were evidently immature have been taken at almost all seasons of the year. The truth seems to be that the food, mainly seeds and buds of coniferous trees, on which they depend, is available in favorable regions during almost the entire year, and it is possible therefore for the birds to nest at almost any season. That the greater part of them nest in late winter or very early spring seems rather probable, but it is desirable that every actual instance of the Crossbill's nesting should be published with all possible details, in order that the matter may be thoroughly investigated and the question definitely settled as soon as possible.

A nest with two eggs was found at Hillsdale, Mich., on the college campus in February of 1893 or 1894, by Mr. G. E. Douglas. Mr. Adolph Hempel, who was with Mr. Douglas at the time, states that there were many crossbills on the campus that winter and that he is sure of the identity and still has the nest and eggs in his possession. Both Chas. L. Cass of Ann Arbor and Prof. Frank Smith of Urbana, Ill., remember the circumstance and are sure there was no mistake about the facts or the identification of the birds. The writer has also been informed that nests of the crossbill (which species is not certain) were found in pine trees on the grounds of the Northern State Normal School at Marquette, Mich., by Miss Flora Mowbray and others, during late winter, but the details have not been learned.

Kumlien and Hollister state that in Wisconsin it nests irregularly in the north central parts of the state and formerly as far south as Dane county. Young just able to fly were procured in a cemetery at Albion, Wis., in August 1869 (Birds of Wisconsin, p. 92). According to Butler they were reported to have nested in the vicinity of Cleveland, Ohio, in the summer of 1878, and a pair is reported to have bred at Bloomington, Ind., in 1885, the nest being placed in a pine tree and made exclusively of pine burrs. Mr. R. B. Moffit informed Dr. Butler that they nested at West Lafayette, Ind. in 1885, and that young birds were taken there (Birds of Indiana, 1897, 919-920). The same authority states that Dr. H. A. Atkins is said to have taken their nests near Locke, Ingham county, Mich., July 13, 1880, but we are unable to verify this statement.

Early in 1906 Mr. Harold F. Tufts found three nests near Wolfville, Kings county, Nova Scotia, two containing young just hatched, the other three eggs advanced in incubation. These nests were found Jan. 31, 1906, and during the following months many other nests were found, most of them placed on horizontal limbs of spruces from twenty to forty feet from the ground and well out from the trunk, others in spruces, firs and hemlocks at elevations ranging from ten to eighty feet. The birds continued nesting until May 7, at which time flocks of full fledged young were to be seen feeding about the woods, while nests with eggs were still to be found (Auk, XXIII, 1906, 339).

While the ordinary call of this bird is a very sharp whistle repeated rapidly three or four times, and sounding as Dr. Gibbs states, like "cleep-cleep-cleep," the birds also have a very sweet warbling song during the nesting season and during the late winter and spring, and even when not nesting they frequently give snatches of this song.

From an economic standpoint the species has little importance. Occasionally it may slightly injure an ornamental evergreen by cutting the twigs or destroying the terminal buds, but ordinarily this is of very slight moment. That it eats numerous insects during the summer can hardly be doubted, but we know very little of its summer food. It is possible that it may occasionally attack grain crops, but no report of this kind has come to our notice as yet.

The eggs, usually four in number, are described as pale bluish, spotted with various shades of brown mixed with purplish gray, and averaging .75 by .57 inches.

TECHNICAL DESCRIPTION.

Adult male: Brick red, usually dull but sometimes almost vermillion, always brightest on rump and crown, dullest on belly and under tail-coverts, the latter often plain dusky; wings dusky, without white markings; tail similar, the tip rather deeply emarginate; bill and feet dark brown; iris light brown.

Adult female: Mainly olive or olive-green, brightening to greenish yellow, or occasionally to clear yellow, on the rump, the crown and breast then usually washed with the same color; ear-coverts, chin, throat and belly usually dusky gray; wings and tail as in male. Young at first resemble the female, but have the head and body, above and below, thickly streaked with dusky. Males probably require more than one year to get the full plumage of the adult, and specimens may be found in every conceivable stage between the yellow and red.

Length 5.50 to 6.25 inches; wing 3.20 to 3.60; tail 1.85 to 2.40.

210. White-winged Crossbill. Loxia leucoptera (*Gmel.*). (522)

Synonyms: Crucirostra leucoptera, Brehm, 1827.—Curvirostra leucoptera, Wilson. —Loxia leucoptera of most authors.

Similar in general appearance to the Red Crossbill, but somewhat larger, the red of the male rose-red or even crimson instead of brick-red, and the wings in both sexes and at all ages with two conspicuous white wing-bars.

The distribution of this species in Michigan is quite similar to that of the Red Crossbill, but it seems to be decidedly less common than that species. In general habits, flight, note, song, and food the two species also are practically identical. Occasionally both forms are found in the same flock, but this is unusual and it often happens that one species will be fairly abundant for a month or more at a particular place while no individuals of the other species can be found.

The nesting habits are even more obscure than those of the Red Crossbill, and so far as we know there is but one record of nesting within our limits. Mr. H. Nerhling states that a nest was found in Delta county, Mich., on April 21, 1891 (Butler, Birds of Indiana, 1897, p. 922). The statement in Cook's Birds of Michigan (2d ed., p. 108), that Samuel Spicer of Genesee county, found a nest of this species there September 28, 1888, is an error; the species referred to was the Goldfinch. The account just given of the nesting of the Red Crossbill at Wolfville, Nova Scotia, will serve equally well for the present species, since Mr. Tufts found nests of the White-winged Crossbill at the same time and place, and in considerable numbers. First nests were found in January, and nests with eggs were still to be found on May 7. He states that the nests of both species were composed chiefly of twigs and beard-moss, but sometimes strips of decayed wood and bark, grasses and plant-down, were added. Some of the nests were seventy feet from the ground, while others were placed in low bushes.

The eggs are described as "pale blue, dotted chiefly at the larger end with black and lilac; averaging .80 by .56 inches" (Coues).

TECHNICAL DESCRIPTION.

Adult male: General color rosy red, sometimes almost carmine on head, breast and rump, and generally without any trace of the brick-red color of the preceding species; usually a black patch back of the ear-coverts, sometimes connected with a black stripe from behind the eye; scapulars also black, and this color often extending across the lower back, forming a black bar between the red of the interscapulars and rump; wings black, with two conspicuous white bars, and the tertiaries also often edged and tipped with white; tail black, sometimes very narrowly edged with whitish; bill, feet and iris brown.

Adult female: General color olive-green or grayish-olive, washed with yellowish as in the Red Crossbill, but the wings always with the two white bars; the wings also are merely dusky or brownish black, not pure black as in the male. Young at first are streaked above and below, but otherwise resemble the mature female. As they grow older the males change from yellowish to yellow, orange, and finally to crimson, but this probably not until the second year.

Length 6 to 6.50 inches; wing about 3.50; tail 2.60.

211. Greenland Redpoll. Acanthis hornemanni hornemanni (*Holb.*). (527)

Synonyms: Greenland Mealy Redpoll.—Linota hornemanni, Holböll, 1843.—Acanthis hornemanni, A. O. U. Check-list, 1886, and most recent writers.—Ægiothus cancescens, Coues, 1861.

The Redpolls (genus *Acanthis*) are described by Ridgway as "small, streaked, red-capped and often rosy-breasted finches with long and distinctly emarginate tail and small acute bill." Two species and two or more subspecies probably occur in the state, but only one is ever abundant. The adults always have a bright garnet crown (whence the name Redpoll), a blackish spot on chin and upper throat, and the males usually are more or less rosy on breast and rump as well.

Redpolls nest only in the far north and are seen within our limits only in winter. From the fact that they are very irregular in their appearance, sometimes coming in flocks of thousands and other winters not appearing at all, they are commonly believed to be driven south by the cold, their numbers here indicating the severity of the winter farther north. More likely, however, their movements depend on abundance or shortage of food supply, although other factors may enter into the problem. All the species and subspecies are so much alike that they can be separated only by the expert.

The present species, the Greenland Redpoll, is the largest and lightest colored of all and is restricted in the nesting season to Greenland, Iceland, Spitzbergen, and eastern Arctic America, wandering southward in winter to the northern boundary of the United States. There is a single specimen in the museum of the Sault Ste. Marie High School, taken in that vicinity March 29, 1900, and identified by the Division of Biological Survey at Washington (Letter from W. P. Melville). We find no other record for the state.

TECHNICAL DESCRIPTION.

"Adults with top of head bright red and a dusky spot covering chin and upper part of throat. Wing exceeding tail by less than length of tarsus; rump plain white or pinkish;

sides very narrowly, or sparsely, or not at all, streaked; under tail coverts with darker shaft-streaks narrow and indistinct, or sometimes altogether wanting; inner webs of tail-feathers very broadly edged with white; plumage in general very light, with whitish or light grayish prevailing on upper parts, the lower parts almost entirely white; adult males with chest and sides of breast merely tinged with delicate peach-blossom pink.

"Length about 5.50 to 6.50 inches. Male: Wing 3.35 to 3.45; tail 2.70 to 2.85; exposed culmen .32 to .37; depth of bill at base .30 to .32; tarsus .62 to .70. Female: Wing 3.25 to 3.35 inches; tail 2.65 to 2.80; bill same as in male; tarsus .62 to .68" (Ridgway).

212. Hoary Redpoll. Acanthis hornemanni exilipes (*Coues*). (527a)

Synonyms: Mealy Redpoll, American Mealy Redpoll.—Ægiothus exilipes, Coues, 1861. -Fringilla borealis, Aud., 1839.—Ægiothus canescens var. exilipes, Ridgw., 1874.

Similar to the preceding, but smaller.

Distribution.—Arctic America and northeastern Asia, south in winter to the northern border of the United States.

This subspecies is included in Stockwell's ("Archer") list in Forest and Stream (VII, 18, 276), and in Covert's list in the same publication, but the only Michigan specimen we have been able to locate is a male in the High School museum at Sault Ste. Marie, collected there December 7, 1899, by Mr. Ralph Endress, and identified by the Division of Biological Survey, U. S. Department of Agriculture (Letter from W. P. Melville). According to Kumlien and Hollister (Birds of Wisconsin, p. 92) this form was tolerably common in Dunn county, Wis., from January to March, 1896, and has been found several times in other northern counties in that state, It is said they may be readily recognized in flocks of the common Redpoll by their lighter color. Although lighter than the common Redpoll they are darker than the Greenland Redpoll.

TECHNICAL DESCRIPTION.

Precisely like the preceding, according to Ridgway, except for size, the present subspecies averaging smaller, and with proportionally smaller and more acute bill.

"Length 4.50 to 5.25 inches. Male: Wing 2.95 to 3.10 inches; tail 2.50 to 2.55; exposed culmen .30; depth of bill at base .22 to .25; tarsus .52 to .58. Female: Wing 2.80 to 3.05; tail 2.30 to 2.60; exposed culmen .28 to .32; depth of bill at base .20 to .25; tarsus .50 to .57" (Ridgway).

213. Redpoll. Acanthis linaria linaria (*Linn.*). (528)

Synonyms: Common Redpoll, Lesser Redpoll.—Fringilla linaria, Linn., 1758, also of Wilson, Nuttall and Audubon.—Acanthis linaria, Bonap., Stejn., A. O. U. Check-list, 1886, etc.—Ægiothus linaria, Baird, Coues, Ridgw. and many others.—Linaria minor, Aud., 1839.

Figure 112.

About the size of the Hoary Redpoll, but decidedly darker, the rump never white and the under tail-coverts always distinctly streaked (Ridgw.).

Distribution.—Northern portions of the northern Hemisphere, south in winter pretty regularly to the northern United States, and occasionally to the middle states (Virginia, southern Ohio and Indiana, Kansas).

This is the common Redpoll which appears frequently in November in large or small flocks and remains until March. Our earliest fall record

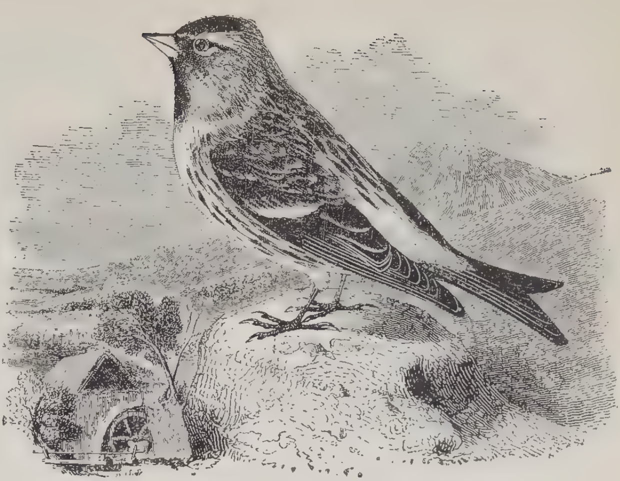

Fig. 112. Redpoll.
From Nuttall's Ornithology. Little, Brown & Co.

is November 9, 1889, on which date one was killed on the Spectacle Reef Lighthouse in northern Lake Huron. In northern Wisconsin it has been observed as early as October 28. It does not visit the south and southeastern counties of Michigan so often as the northern parts of the state, probably because it finds abundance of food and suitable conditions in the north.

It feeds to a large extent on the seeds of the birches and alders, but also attacks the cones of the tamarack and arbor-vitæ, and probably to some extent those of other pines. It also feeds freely on grass-seeds and weed-seeds, but takes to the bare ground with some reluctance. Not infrequently it is found in company with crossbills and has been known to follow the latter and extract seeds from the cones torn open by the stronger bird.

Apparently it has little or no song even at the nesting season, though one observer speaks of a faint warble and another of a "twittering."

The nest, found only in arctic and subarctic regions, is built of various grasses, plant fibres and moss, lined with feathers and hair, and placed in low bushes, alders, willows, etc., usually but a foot or two above the ground. The eggs are three to five, bluish white finely spotted with brown, and average about .69 by .48 inches (Ridgw.).

TECHNICAL DESCRIPTION.

"Adult: Top of head bright red (usually crimson), and a dusky spot covering chin and upper part of throat; wing exceeding tail by more than length of tarsus; rump distinctly streaked; sides distinctly, often broadly and heavily, streaked with dusky; under tail-coverts with very distinct dusky mesial streaks; inner webs of tail-feathers very slightly, if at all, edged with white; plumage in general darker, with darker markings prevailing on upper parts, the lower parts never entirely white; adult males with chest and sides of breast deep madder-pink; bill in winter yellow, tipped with black. Females lack the red of breast and sides but have the red cap. Young of both sexes are without red on crown or elsewhere; whole head streaked with dusky and grayish or brownish white, the latter color prevailing on under portions; otherwise much as in adult female, but plumage of much softer, more 'woolly' texture, and markings less sharply defined" (Ridgway).

"Length 4.50 to 5 inches, with proportionally longer and more acute bill. Male: Wing 2.80 to 3.05 inches; tail 2.20 to 2.50; exposed culmen .32 to .38; depth of bill at base .22 to .27; tarsus .55 to .60. Female: Wing 2.75 to 2.90; tail 2.20 to 2.40; exposed culmen .30 to .37; depth of bill at base .20 to .25; tarsus .55 to .60" (Ridgway).

214. Greater Redpoll. Acanthis linaria rostrata (*Coues*). (528b)

Synonyms: Ægiothus rostratus, Coues, 1861.—Acanthis linaria rostrata, Stejn., 1884, A. U. O. Check-list, 1886.

Similar to the common Redpoll (and also to Holbœll's Redpoll),* but much larger, darker, and the bill relatively shorter, thicker, and less acute (Ridgw.).

Distribution.—Greenland and northeastern North America, south irregularly in winter to New England, New York, and northern Illinois.

Apparently a rare winter visitor to Michigan. The first specimen recorded was taken by F. H. Chapin, of Kalamazoo, in the winter of 1878, and referred to Dr. Morris Gibbs, and by him to Robt. Ridgway, for identification. A second specimen, a female, is in the High School Museum of Sault Ste. Marie, Mich., taken near that place, December 7, 1899, by W. P. Melville, and identified by the Division of Biological Survey, U. S. Department of Agriculture, Washington, D. C. Two more females were taken near Kalamazoo, one January 23, 1904, and the other March 1, 1904, by W. Wilkowski, Jr., and identified by Ridgway. These were found in flocks of the common Redpoll.

In northern Wisconsin, according to Kumlien and Hollister (Birds of Wisconsin, p. 93), more than thirty specimens were collected in Dunn county, in the winter of 1895-96, and examples identified by Ridgway. Others have been taken from time to time in Wisconsin, always associated with the common Redpoll.

TECHNICAL DESCRIPTION.

Ridgway discriminates between this bird and its nearest relatives as follows: Length about 5.25 to 5.75 inches; with proportionally shorter, thicker, and less acute bill; wing averaging more than 3.15 in males, more than 3.05 in females; color also usually darker than in *A. linaria* and *A. holbœlli,* the lateral lower parts usually much more broadly or heavily striped.

Male: Wing 3.05 to 3.30 inches; tail 2.35 to 2.70; exposed culmen .32 to .42; depth of bill at base .25 to .30; tarsus .60 to .70. Female: Wing 2.95 to 3.25; tail 2.40 to 2.60; exposed culmen .33 to .42; depth of bill at base .25 to .30; tarsus .60 to .68.

215. Goldfinch. Astragalinus tristis tristis (*Linn.*). (529)

Synonyms: American Goldfinch, Yellowbird, Thistle-bird, Lettuce-bird, Wild Canary. —Fringilla tristis, Linn., 1758, also of Wilson, Bonap., Audubon, Nuttall.—Spinus tristis' A. O. U. Check-list, 1886.—Chrysomitris tristis, Baird, Allen, Coues and others.

Figure 113.

The male in summer, with lemon-yellow body, velvet-black cap, and black wings and tail with white edgings, is unmistakable. The female is yellowish brown without strong contrasts of color, although yellow predominates below.

Distribution.—Temperate North America generally, south in winter to lower boundary of lower California; breeds southward to the middle districts of the United States, and winters mainly within the United States.

One of the commonest and best known birds throughout the state, universally distributed and found both summer and winter, although the winter plumage is so unlike that of summer that the birds usually pass unrecognized. Moreover, it is much less abundant in winter, and often the entire season may pass without any being seen. Undoubtedly all the summer Goldfinches in any one region move southward in autumn, and those which are found in winter have come from more northern regions. These latter seem to return northward again in spring before their plumage has brightened much, but very soon the birds appear which have wintered farther south and these already have begun to take on the brighter summer plumage. They reach middle Michigan in flocks the last of April or first of May and during that month and June are very conspicuous, feeding on the seeds of the elms, often on the ground, or gathering by scores on the patches of dandelions to feast on the ripening seeds.

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* For note on Holbœll's Redpoll, see Appendix.

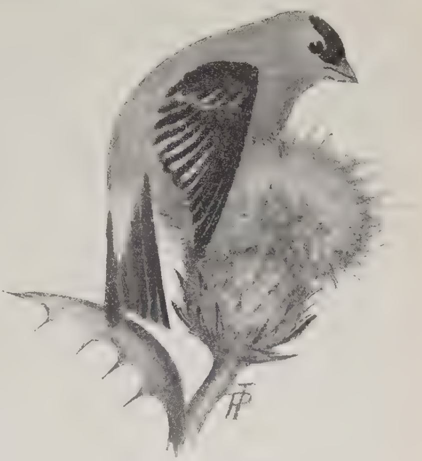

Fig. 113. Goldfinch.
Adult male, in midsummer.

They remain in flocks until nesting begins, which is usually not until early July, and probably many of the birds do not nest until late in that month. Eggs may be found all through August and occasionally in September. Samuel Spicer of Goodrich, Genesee county, records a nest with two fresh eggs found in a corn shock September 28, 1888. The nest is commonly placed in small orchard trees or shade trees, frequently in nurseries or willow thickets, and at heights varying from two to thirty feet from the ground. It is compactly and very neatly built of grasses and plant fibres, is deeply hollowed and lined with the softest of fibers, often with down from thistle, milk-weed, and other plants. The eggs are three to six, very pale blue and usually without spots, but rarely with a few brown specks. They average .66 by .47 inches.

The Goldfinch feeds mainly on seeds of various kinds, among which those of the Compositæ hold the most important place. Its fondness for lettuce seed has earned for it the name of Lettuce-bird in some sections and the names Thistle-bird and Salad-bird have a similar origin. The fact that the young are fed mainly on the (regurgitated) seeds of these Compositæ, which are mostly late blooming plants, has been given as the probable explanation of the late nesting, and no better one has been offered thus far. That insects form some small part of the food is probable, but no great amount of credit can be claimed on this account. The consumption of weed seed, however, is a positive benefit, but perhaps hardly more than repays the market gardener and seedsman for the turnip, lettuce, and other valuable seeds taken. Besides the seeds named the Goldfinch eats a host of others and is particularly fond of goldenrod, aster, and the various wild sunflowers; also in winter it eats the seeds of the birch and alder, and, with the Pine Finch or Siskin, visits the arbor-vitæ and scrub pine and extracts such seeds as it is able.

Its ordinary call-note when at rest is very similar to that of the common canary, but it has another call, loud and characteristic, used mainly on the wing, and consisting of four emphatic notes. Its song is also somewhat canary-like and is often long continued and varied. Dr. Brewer says of it "It is sweet, brilliant and pleasing; more so indeed when given as a solo with no others of its kindred within hearing. I know of none of our common singers that excel it in either respect. Its notes are higher and more flute-like, and its song is more prolonged than that of the Purple Finch. Where large flocks are found in spring and early summer the males often join in a very curious and remarkable concert, in which the voices of several performers do not always accord. In spite of this frequent want of harmony, these concerts are varied and pleasing, now ringing like the loud voices of the canary, and now sinking into a low soft warble."

This bird is always sociable and is found in flocks during the greater part of the year. Even during the nesting season the males frequently gather in little companies about watering-troughs and other drinking places, and frequently a dozen of these bright plumaged birds will be found bathing in a puddle in the middle of the road.

TECHNICAL DESCRIPTION.

Adult male: In summer; forehead and front half of crown velvet black; upper tail-coverts white; rest of upper parts, including scapulars, bright lemon-yellow; entire under parts the same, except the under tail-coverts, which are white; wings deep black, the greater and middle coverts tipped with white, and most of the secondaries and tertiaries edged and tipped with the same; tail clear black, each feather with a broad white spot on inner web near tip; bill yellow; iris brown.

Adult female: In summer; upper parts olive-brown, yellowish on outer edge of scapulars; under parts buffy or yellowish-brown, varying to dull greenish-yellow, and whitening on belly and under tail-coverts; wings and tail about as in male, but duller black or even brownish. In winter the female is similar, but browner above and less yellowish below, the white wing-markings changing to buff. The male in winter resembles the female quite closely, but the wings are much blacker and the light wing-markings broader. Young birds of both sexes resemble the winter female, but are still browner and more buffy.

Length 4.45 to 4.50 inches; wing 2.60 to 2.90; tail 1.80 to 2.10; culmen about .35.

216. Pine Finch. Spinus pinus (*Wils.*). (533)

Synonyms: Siskin, Pine Siskin, American Siskin, Pine Linnet.—Fringilla pinus, Wilson, 1810, also of Nuttall and Audubon.—Chrysomitris pinus, Baird, 1858, Coues, 1873, B. B. & R., 1874, and many others.—Spinus pinus, A. O. U. Check-list, 1886, and most recent authors.

Size and general appearance of the female Goldfinch, but distinctly streaked with brown and gray, above and below, and with no yellow except on wings and tail; the half concealed yellow wing patches being characteristic.

Distribution.—North America generally, breeding in the British Provinces and sparingly in the northern United States.

Like its near relative, the Goldfinch, the Pine Finch is resident throughout the year in Michigan, but in a very different way. Over the larger part of the state it occurs only as a winter visitor or as a spring and fall migrant, appearing in flocks from October to March and occasionally lingering well into May and then disappearing northward. Throughout a considerable part of the northern half of the state, however, it is resident during the summer, and it unquestionably nests in the higher parts of the Lower Peninsula, north of the Saginaw Grand Valley, and probably over the larger part of the Upper Peninsula. Its appearance is quite irregular in the southern half of the Lower Peninsula, some years none appearing, while at other times it is fairly abundant.

Often it comes in small or moderate sized flocks by itself, feeding principally on the seeds of the white cedar or arbor-vitæ, the larch or tamarack and the various pines and spruces, but also when the ground is bare, eating the fallen seeds of maple, elm and other trees and devouring weed and grass seeds with relish. It associates freely with the winter Goldfinches and Redpolls, and not infrequently is seen with the crossbills, and eating the same food. It has been reported frequently in spring as eating dandelion seeds, and the late Percy Selous observed it at Greenville, Montcalm county, as late as May 25, 1897, feeding on these seeds. Peet found it feeding among balsams and tamaracks on Isle Royale, in July, 1905 (Mich. Geol. Surv., Rep. 1908, 365), and Blackwelder states that in late summer, in Iron county, it was seen in small bands and was especially characteristic of cedar swamps (Auk, XXVI, 1909, 368).

We do not know of the actual finding of a nest within the limits of the state, but the University of Michigan expedition found it common in the Porcupine Mountains, Ontonagon county, from July 15 to August 14, 1904, and females were seen to carry nesting material from the camp into the woods, while the reproductive organs of the specimens taken showed that they were breeding. Dr. W. H. Dunham also writes that it is rather common in Kalkaska county and nests in April and early May, but he does not seem to have actually found the nest. Mr. O. B. Warren states that in Marquette county it is an abundant migrant and breeds. He adds "Although the vast majority of those seen in migration do not stop to breed, yet the better one becomes acquainted with the bird at Palmer the more common is seems in summer" (1898).

In Wisconsin, according to Kumlien and Hollister, it is not known to breed, although Dr. Hoy believed that it nested in the pine regions. The nest has been found in other states from about the first of May until July 1. A nest was taken at Sing Sing, New York, May 25, 1883, by Dr. A. K. Fisher.

The nest is described by Ridgway as a compact structure of pine twigs, rootlets, hair, plant fibres, etc., lined with fine rootlets and hair. It is placed at moderate heights in evergreen trees. The eggs are three or four, pale bluish or greenish, thinly dotted with brown and black, and average .62 by .50 inches.

Even during the summer the birds are usually found in flocks and fly with a wheezy, chattering note which is quite characteristic. Dr. Jonathan Dwight, Jr. speaks of their song as a "soliloquizing gabble interspersed with a prolonged wheeze," and says that their ordinary call-note is much like the common note of the English Sparrow.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Entire upper parts brown or brownish-gray, streaked thickly with blackish; under parts grayish white to almost pure white, streaked with brownish or blackish; wings blackish, the primaries narrowly edged with pale yellow on outer margins, and both primaries and secondaries largely sulphur-yellow toward the base; tail like the wings, largely yellow at base and without any white spots at tip; bill dusky; iris brown. Young similar to adults, but wing-coverts usually tipped with deep buff or tan-color.

Length 4.50 to 5.25 inches; wing 2.75 to 2.90; tail 1.85 to 1.95; culmen .35 to .40.

217. English Sparrow. Passer domesticus (*Linn.*).

Synonyms: House Sparrow, European House Sparrow, Sparrow.—Fringilla domestica, Linn., 1758.—Passer domesticus of most authors.

Figure 114.

The adult male has a clear ash-gray crown, deep black throat and upper breast, with white on both sides, and a conspicuous chestnut collar or cape extending from the eyes along the sides and back of neck. The wings and back are streaked chestnut and black with a short white bar on the shoulder, the "chip" which the little fighter carries on his shoulder as a challenge to all others of his kind.

Distribution.—Nearly the whole of Europe and practically all of temperate North America, as well as Australia, New Zeeland and parts of South America. Originally a European bird, it has been carried all over the world and has now become naturalized in almost all temperate climates of both the northern and southern hemispheres.

The English Sparrow, more properly known as the European House Sparrow, was first brought to America, so far as we know, in the fall of 1850, when eight pairs were brought to Brooklyn, N. Y. and liberated in the spring of the following year. Since this time there have been scores, probably hundreds of importations, and small lots of sparrows have been transferred from one city in the United States to another, and subsequently transfers of these plantings have been made until the bird is now naturalized over practically the whole United States.

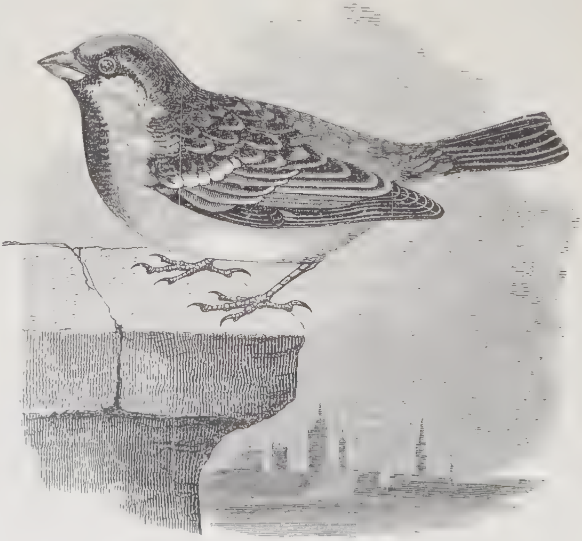

Fig. 114. English Sparrow. Adult male.
From Bull. 1. Biol. Survey, U. S. Dept. Agriculture.

So far as we can learn the first birds were brought to Jackson, Michigan, between 1874 and 1876, and four birds were liberated at Owosso in 1876. The place from which these birds were obtained is not known. The Sparrow is now abundant throughout all the larger towns and cities of the entire state and also in most of the smallest villages and hamlets, unless these are situated at considerable distances from any railroad or lake or river port.

Its habits are too well known to need extended mention. It is an unmitigated pest, whose good points are so few that they may be summed up in a few lines. The Sparrow remains with us through the winter and his presence does something to enliven that nearly birdless season; it eats some insects, a few of which are injurious; it consumes some grass seed and weed seeds. That is all.

On the other hand, its bad qualities are numerous and pronounced. It is a natural grain eater and regularly damages grain crops in the field and in the shock; it eats buds, young sprouts, flowers and seeds of almost every green thing which is cultivated; at certain times and places it does considerable damage to fruit, although this is one of its lesser crimes; it is a persistent enemy of our native birds, particularly of those kinds which appear to seek the vicinity of dwellings, or which nest in boxes, holes or other places prepared for them by man.

From the fact that the Sparrow remains with us over winter and begins to nest very early in the spring it naturally takes possession of all the available nesting places, so that when the Bluebird, Wren, Phœbe and Tree Swallow arrive they find their homes occupied and are compelled to fight for them or go elsewhere. Even the Purple Martin has been dispossessed in many instances and the decrease in its numbers, which has been noticeable in the last two decades, probably is largely attributable to the Sparrow. Not only does the interloper affect these species, but it often directly attacks Robins, Song Sparrows, Chickadees, Flycatchers, Thrushes, Tanagers, and a host of other birds, annoying them by repeated visits to their nests or by actual attacks on them while feeding.

One of the most serious aspects of the Sparrow problem is due to its filthy habits. It gathers in immense flocks to roost and often selects cornices, windowcaps, ornamental work about the eaves and gables of buildings, and the vines which cover the walls of public and private dwellings. In these places its presence is soon shown by the defacement of the structures by its droppings, by the destruction of the vines, and the litter which it causes. Often still further damage is caused by its carrying nesting material into gutters, down-spouts, and similar places about the eaves, so that the water of cisterns is defiled, or overflow of pipes results, sometimes causing great damage.

The reader who is interested in the details of these charges may consult the author's work on the English Sparrow, published as Bulletin No. 1 of the Division of Economic Ornithology of the United States Department of Agriculture, in 1889.

Within the last decade two new and serious charges have been made against the Sparrow; one, that it is frequently concerned in the spread of hog cholera, the other, that it is partly responsible for the distribution of the lice and mites which affect poultry. The evidence in support of the latter charge is direct and convincing. Sparrows are always attracted to poultry yards by the food to be found there. They use feathers freely for lining their nests, both in summer and winter. Thus their nests become infested with the lice and mites of the chickens. Careful experiment has shown that at least one species of chicken mite, *Dermanyssus gallinæ*, and probably the worst one, is perfectly at home on the English Sparrow, frequently swarms in its nests, and after multiplying freely on the Sparrow may be transferred again to chickens without any loss of vitality. A single feather in a Sparrow's nest was found to carry 72 living chicken mites, and at least 250 similar feathers were found in this single nest, giving a probable total of at least 18,000 mites in one nest (Ewing, Auk, XXVIII, 1911, 335-340). In the light of such facts the numerous Sparrow's nests about barns and sheds, as well as in trees about the farm yard, should acquire added significance.

Turning now to the question of hog cholera, that modern scourge which has caused losses of millions of dollars to American farmers, we find the evidence less direct but almost equally convincing. Single cases, and even some extensive outbreaks of hog cholera have been traced to the transfer of the germs from farm to farm on the boots of the laborer or the common farm vehicles and stable implements. The manure and mud of an infected hog pen must contain the germs of the disease. What more likely, more inevitable, more certain, than that Sparrows feeding on and in that mud should carry some of it away on bill and feet and so infect other hog yards, perhaps miles away? We do not know that the germs of hog cholera have ever been demonstrated from the mud on Sparrows' feet, but we do know of more than one outbreak of the dreaded disease, from which all ordinary modes of infection were apparently excluded, but where English Sparrows were known to have passed freely in and out of the yards, and might easily have brought the infection from farms less than a mile away. We have no wish to condemn the Sparrow on mere suspicion, yet the known and proved evils which attend his presence are so real and serious, and the benefits claimed (very few of which have been proved) are so meager and insignificant, that it seems the part of common prudence for everyone interested in agricultural welfare and the beauty of country life to do all that can be done legitimately to exterminate this bird.

The English Sparrow when once fairly established increases with phenomenal rapidity. Two broods at least are reared in a season, and usually three, while instances of four or five broods have been reported by competent observers. Moreover, the young seldom number less than four in a brood and the old birds are remarkably successful in getting them safely on the wing, so that in favorable seasons an immense number of Sparrows may be reared in a comparatively small area. Without quoting the sensational figures which are sometimes introduced we may say that a dozen pairs in a city will produce hundreds of thousands in the course of three or four years, and in making plans to exterminate Sparrows this remarkable fecundity must be reckoned with. The dangerous character of the Sparrow has been recognized generally throughout the country for nearly thirty years, and various suggestions for restriction and extermination have been made, but the hopelessness of the attempt to entirely exterminate is now almost universally conceded. Several of the states early resorted to bounties, not only without good results, but with disastrous effect upon our native birds. In 1887 Michigan enacted a bounty law allowing one cent apiece for Sparrows in lots of not less than twenty-five. At a subsequent session of the legislature this act was amended so that the bounty was increased to two cents apiece and the birds might be presented in lots of ten or more. Some of the defects of the earlier bounty laws were also corrected and the law remained on the books until repealed in the spring of 1901. The legislature of 1905, however, reenacted practically the same bounty law, with the proviso, however, that it should take effect only in such counties as saw fit to adopt it by a majority vote of the Board of Supervisors. Very few of the counties appear to have made the act effective, in fact, up to the present time we know of but three counties in which such bounties are paid.

We have not space to go into the merits of bounty laws in general. It is sufficient to say that except under very unusual conditions they serve no useful purpose, but result in only a slight reduction of the numbers of the animals attacked, while they invariably produce more or less corruption among the people taking advantage of the bounty offer, and usually, as in the case of the Sparrow, work much harm to beneficial species. In Michigan the Sparrow laws have served no useful purpose whatever. True, in two or three instances the number of Sparrows has been temporarily reduced, but in no case has the reduction been carried anywhere near the point of extermination, and as soon as active warfare against them was relaxed they speedily regained their former numbers. On the other hand, the taxpayers of the several counties have been called upon to pay out enormous sums for this work and the most scandalous corruption has been developed in certain places.

Owing to the fact that the bounty money is paid entirely out of county funds it has proved impossible to get complete figures for the state or even for any single county, but some of the figures obtained by direct correspondence with county officers are sufficiently suggestive. Thus complete returns were obtained from nineteen counties, all in the Lower Peninsula, for the year 1898, and they showed amounts ranging from $12.36 in Gladwin county to $3,804.60 in Gratiot county. The total bounties paid in that year by the nineteen counties amounted to $21,416.06, the average being $1,127.16. During that year Eaton county paid $1,386.00, Genesee county $1,697.00, Jackson county $2,370.00, Ingham county, $2,407.00. Remembering that these nineteen counties represent less than one-fourth of the state, it would certainly be within bounds to estimate the total Sparrow bounties paid in 1898 at $50,000.00. The increase of bounties paid during successive years in some of the counties is also very suggestive; thus Branch county in 1894, paid $142.00, in 1895 $170.00, in 1896 $352.00, in 1897 $890.00, and in 1898 $1,064.00. Gratiot county in 1896 paid $967.00, in 1897 $2,239.00, and in 1898 $3,805.00. Ingham county in 1896 paid $432.00, in 1897 $1,372.00, and in 1898 $2,407.00.

Careful inquiry in all the counties where the largest amounts were paid has satisfied us that there has been no appreciable decrease in the number of Sparrows as a result of the money expended. Moreover, fraud and graft have developed to an alarming degree in connection with the Sparrow bounty law, and serious, and in several cases fatal, accidents have resulted from the use of firearms in the hands of careless and inexperienced people, and particularly in the hands of boys who have used firearms within city limits and in violation of the ordinances. This feature of the case alone should prevent the adoption of the bounty law by any county of the state.

The conditions affecting Sparrow increase in Michigan probably are unlike those in most of the states, at all events it is certain that Sparrows will not increase indefinitely in our larger cities. A succession of two or three mild winters will be followed, almost always, by a noteworthy increase in the number of Sparrows; but not all these will remain in the cities or towns where they were bred, a large part of the increase will spread out through the surrounding country and only a part of this increase will return to the cities in winter. An ordinarily severe winter kills off a very large number of Sparrows. Just what is the proportion thus killed it is impossible to say, but severe winters have a marked effect in cutting down the numbers, and two or three severe winters in succession would doubtless do more to lessen their numbers than the expenditure of several millions of dollars in bounties.

It is entirely feasible to kill out one-half to three-fourths of the Sparrows in any city in a single winter, at a very small expense, by the judicious use of poisoned food. This work of course should not be trusted to irresponsible parties, but certain persons should be designated and paid for the work, and proper precautions should be taken to prevent accident of any kind. The system which has been successfully used by individuals in various places in the country is as follows: During midwinter, when the Sparrows have congregated in the towns and cities and when heavy snow has covered most of the available food and they are pinched more or less for supplies, they should be baited for several successive days to some stable yard or inclosed area where they will gather in immense numbers if not needlessly alarmed. When several hundreds have thus been lured to feed regularly, and the amount of food which they will consume completely has been determined, a similar amount of the same food, previously soaked with strychnine and carefully dried, is fed to them at the usual time. Ordinarily the whole of this poisoned grain will be eaten, and four-fifths of the Sparrows will die within a few moments and within a few yards of the feeding place. The remainder will flutter a little farther away, but within a few hours every Sparrow which ate at this place is likely to die. No danger whatever is to be apprehended to cats, dogs, pigs or other animals which might eat the poisoned Sparrows, and if any poisoned grain is left uneaten it can readily be swept up for use at another time or can be destroyed by burning if desired. There is far less cruelty in killing Sparrows in this way than by ordinary shooting or trapping, since experiment with caged Sparrows shows that strychnine is very quickly effective and that the Sparrows die from it with practically no pain at all. It is important that the poisoning should be done only during the winter season, when all native birds are absent, and in case poultry or pigeons are attracted by the baiting they may be excluded by the use of coops made of laths, through the spaces of which the Sparrows can pass freely while the pigeons will be kept out.

For illustrations of the working of the Michigan law and other bounty laws the reader should consult the work on the English Sparrow already mentioned, or an article by Dr. T. S. Palmer entitled "Extermination of Noxious Animals by Bounties," which may be found in the Yearbook of the United States Department of Agriculture for 1896, pp. 55-68.

If any bounty law is to remain upon the Michigan statute books it is certainly advisable that it should be materially different from the present law. Under the statutes Sparrows may be killed at any time of year, although bounties may be paid only in December, January and February, and the examination of Sparrows so killed is made by the county clerk of the "township, village or city within which such Sparrows have been killed." While the bounty law provides a fine for the attempt of any person to collect a bounty on birds other than English Sparrows, it is obvious that the aforesaid county clerk must be able to discriminate between English Sparrows and other birds or there is danger not only that bounties will be illegally paid, but that many of our valuable birds will be destroyed. Under the best conditions bounty laws are expensive and unsatisfactory, and so far as the English Sparrow in Michigan is concerned they are at least extremely unwise and ineffective.

TECHNICAL DESCRIPTION.

Adult male: Top of head clear gray; a broad stripe of chestnut runs backward from the eye and spreads on the nape and sides of neck so as to form an imperfect collar or cape; back and scapulars streaked with black and chestnut; rump and upper tail-coverts plain brownish gray; under parts grayish-white or almost white on sides of neck and cheeks, the middle line of throat and a large patch on the chest deep black; most of the wing-coverts and outer margins of secondaries and tertiaries bright chestnut, the middle coverts pure white in strong contrast; wing and tail feathers plain dusky; bill and feet black; iris brown. In winter the clear ash gray becomes more brownish, the white under parts decidedly brownish gray, and the black throat and chest more or less veiled by gray tips of the feathers.

Adult female: General color brownish, darkest above, fading to brownish gray on breast and sides and to soiled whitish on the belly; back, wing-coverts and tertiaries black, streaked or edged with buff or rusty; usually a pale buff or whitish streak behind the eye, and the middle wing-coverts tipped with buffy or whitish, but no clear black, white, or chestnut about the head. Young birds at first resemble the females, but within two or three months the young males show traces of the distinctive head markings.

Length 5.50 to 6.25 inches; wing 2.85 to 3; tail 2.35 to 3. Female decidedly smaller than male.

218. Snow Bunting. Plectrophenax nivalis nivalis (*Linn.*). (534)

Synonyms: Snowflake, Snowbird, White Snowbird.—Emberiza nivalis, Linn. 1758.—Passerina nivalis, A. O. U. Committee, 1899.—Plectrophanes nivalis of most others until 1882.—Plectrophenax nivalis, Stejn., 1882, A. O. U. Check-list, 1886, and most recent authors.

Males in winter are mainly white below, mottled white, black and chestnut above, with the wings mainly white, but tipped with clear black. The females are similar, but with brownish black replacing the clear black. Toward spring the amount of brown decreases and the black and white become purer and more prominent.

Distribution.—Northern parts of the Northern Hemisphere, breeding in the Arctic regions; in North America south in winter in the Northern United States, irregularly to Georgia, southern Illinois, Kansas and Oregon.

This well known bird is a regular winter visitor to all parts of Michigan, but in much greater abundance along the shores of the Great Lakes and about the mouths of the rivers, and in greater numbers some years than in others. Stragglers and small squads appear in the northern counties late in October; Wood took a specimen at Caseville, Huron county, Oct. 12, 1910, and Selous took one at Greenville as early as October 9, 1897. There is also a record for Mason county as early as September 25, 1909 (Chaney, Auk, XXVII, 275). In the middle counties and southern parts of the state it rarely appears in force before November and the largest flocks, often aggregating several thousand, are most often seen after midwinter. The bird is decidedly gregarious and delights in flying in the stormiest weather. Indeed, its appearance in numbers is often considered the harbinger of snow, and during heavy snow storms it seems to be particularly active and restless.

Its food is obtained almost entirely from the ground and consists mainly of small seeds of various kinds, although Professor Aughey states that in Nebraska it always eats locusts eggs when they are obtainable. Its consumption of grass and weed seeds must be enormous, but owing to the desolate character of the regions it frequents, and the brevity of its visits to farming lands, it seems doubtful if this work has any great economic value.

The bird has a peculiar rolling twitter or whistle which is quite characteristic and very pretty. In its summer home it is said to have a very musical warble.

It usually retires northward with the disappearance of snow in March or early April, but a few linger for some weeks, and occasionally until the end of April. A. B. Covert records a large flock at Cadillac on May 11, 1882, but it seems more likely that this was a flock of Lapland Longspurs.

In the neighborhood of Detroit Mr. Swales records it only as late as March 16, and the latest date on which specimens were killed at Spectacle Reef Light, in northern Lake Huron, was April 23, 1890. According to Mr. Eifrig this species arrived at Fullerton, in the northwestern part of Hudson Bay, from April 7 to April 20, 1904 (Auk, XX, 240), and since these birds nest almost altogether within the Arctic Circle, it is evident that the great majority of them must leave our state long before the first of May.

It nests only at the far north, building a somewhat bulky, warm nest on the ground, and laying three or four whitish, brown-spotted eggs which average .91 by .64 inches.

Formerly this species was slaughtered commonly for food and also for millinery purposes, the beauty of the black, white and brown plumage rendering it particularly attractive as a "hat bird." Fortunately wise legislation and growing public sentiment have largely stopped this business, but during the earlier years when bounties were paid on English Sparrows, thousands of heads of Snow Buntings were palmed off on more or less unsuspecting county clerks as those of Sparrows.

TECHNICAL DESCRIPTION.

Bill yellow, its tip dusky; claw of hind toe longer than the toe itself, curved.

Adult male in winter: Top and sides of head, rump and usually a patch on each side of breast more or less rusty or fawn-colored; back and scapulars mottled with ashy white and pure black, each feather being black centrally, with a broad whitish margin; under parts pure white, often soiled to gray; wings mostly white basally, the terminal half of the primaries clear black, the tertiaries mainly black, edged with rusty; tail with three outermost pairs of feathers mainly white, the remainder mostly black but with narrow white edgings. There is infinite variation in the relative amounts of black, white and rusty on the upper parts, the forehead and crown being often very dark brown, almost blackish.

Adult female in winter: Similar to male, but the black of wings duller, and only two outer pairs of tail-feathers mainly white. As spring approaches the rusty tints lessen in both sexes and the black and white become purer and more strongly contrasted. Young birds resemble the adult females, but have no white at the base of primaries.

Length 6 to 7 inches; wing 4 to 4.50; tail 2.70 to 3.15; culmen .39 to .42. Female averaging a little smaller than male.

219. Lapland Longspur. Calcarius lapponicus lapponicus *Linn.* (536)

Synonyms: Common Longspur.—Fringilla lapponica, Linn., 1758.—Emberiza lapponica, Bonap., Aud.—Plectrophanes lapponicus, Baird, Coues, 1873.—Centrophanes lapponicus, Coues, Ridgw.—Calcarius lapponicus, A. O. U. Check-list, 1886, and most recent authors.

Similar in size and general appearance to the Snow Bunting, but usually with a large black patch on the throat and upper breast, and a more or less distinct chestnut "collar" about the back of the lower neck. In spring plumage the black patch is very conspicuous, in fall or winter more or less obscured by white tips of the feathers. The bird also has streaked sides and is distinctly darker on the back than the Snow Bunting. Since it often occurs as a straggler in flocks of Snow Buntings it may be picked out by its conspicuously darker color. The name Longspur refers to the lengthened nail or claw on the hind toe, but this is not distinctive, since the Snow Bunting has one nearly or quite as long and the Horned Lark's is even longer.

Distribution. -Northern portions of the Northern Hemisphere, breeding far north; in North America south in winter to the northern United States, regularly to the middle states, accidentally to South Carolina, and abundantly in the interior to Kansas and Colorado.

This is another winter resident, often found with the Snow Buntings and Horned Larks, but usually singly or in small numbers. On the other hand as a migrant it frequently occurs in October and November, and again in April and May, in large flocks, but apparently these do not use the same route in successive years, for the visits at any one place seem to be quite irregular. It seems to come from the north earlier than the Snow Bunting, often as early as the first of October (Charity Island, Saginaw Bay, Sept. 30, 1910, Wood), and frequently lingers until after the first of May. We have records of two specimens killed on Spectacle Reef Lighthouse, in northern Lake Huron, May 17, 1891, and May 15, 1892. According to Swales it does not occur commonly in southeastern Michigan, where he has never observed it personally; on the other hand Mr. J. Claire Wood states that he finds it a common spring migrant near Detroit up to the first week in May. At Houghton, Mich., Mr. Wilbur H. Grant found it by thousands October 1 and 2, 1904, and W. P. Melville found specimens with a flock of Shore Larks at Sault Ste. Marie. October 6, 1898. At Kalamazoo, Mich., in 1904, Mr. William Wilkowski, Jr., states that they were first seen November 11, and were still there in flocks of hundreds on November 19. He also says that they were abundant there during December, 1902, and January, 1903.

In Ingham county it does not seem to be abundant regularly, but was noted in some numbers by T. L. Hankinson as late as November 15, 1896, and again in large flocks March 21, 1897. Undoubtedly the great majority pass far south in the fall and return again in the spring, while comparatively few spend the winter with us. At Grand Rapids C. W. Gunn recorded it years ago as a rare winter visitor, appearing in company with Shore Larks and Snow Buntings; and in St. Clair county, Mr. P. A. Taverner states that according to his experience there is always a little bunch of Longspurs with each large flock of Snowflakes. For an account of the migration of this species, from its breeding grounds north of the 60th parallel to its winter quarters between the 40th and 37th parallel see R. H. Howe, Jr., Auk, XVIII, 1901, 396-397.

Its food while with us consists entirely of seeds of various weeds and grasses, and so far as we know is precisely like that of the Snow Bunting.

Before leaving us in the late spring it often sings snatches of its beautiful song, but hardly enough to give a good idea of its quality. Of its song in Alaska Mr. E. W. Nelson says: "It is an exquisite jingling melody, having much less power than that of the Bobolink, but of the same general character; though shorter it has even more melody" (Nat. Hist. Coll. in Alaska, p. 184).

It breeds only in the far north, building its nest of grasses, moss, etc. on the ground and laying three to six eggs, which are dull white, heavily spotted and washed with brown, and averaging .83 by .60 inches.

TECHNICAL DESCRIPTION.

Claw of hind toe longer than toe itself, gently curved; outer tail-feather with inner web largely blackish.

Adult male in spring: Top and sides of head, entire throat, and chest deep black, often with a few white or rusty feathers; a buffy or whitish stripe behind the eye, running down the side of neck to the breast; hind neck with a reddish brown or chestnut collar; rest of upper parts streaked with black and buffy in about equal amounts; breast, belly and under tail-coverts white; sides and flanks streaked with blackish; wings blackish, with two narrow white bars (on tips of greater and middle coverts), the outer primary edged with white on outer vane; two outer pairs of tail-feathers marked obliquely with white. The adult male in autumn and winter is similar, but the black of head and chest and the chestnut collar are largely obscured by the ashy tips of the feathers.

Adult female: Similar to the winter male, but smaller and the black areas more restricted and much more obscured, so that the throat and breast show little or no black; the chestnut collar often wanting altogether.

Male: Length 6.10 to 6.90 inches; wing 3.60 to 3.90. Female: Length 5.50 to 6 inches, wing 3.50 to 3.60.

Note.—For an account of the Painted Longspur or Smith's Longspur, not yet recorded from Michigan, see Appendix.

220. Vesper Sparrow. Poœcetes gramineus gramineus (*Gmel.*). (540)

Synonyms: Grass Finch, Bay-winged Bunting, Pasture Bird, Grass Sparrow, Ground-bird.—Fringilla graminea, Gmelin, 1789, also of Audubon and Nuttall.—Emberiza graminea, Wils.—Zonotrichia graminea, Bonap.—Poocætes gramineus, A. O. U. Check-list, 1886.—Poœcetes gramineus, Sclater, 1862, and most recent writers.

Plate XLVII.

One of our larger, streaked, gray-brown sparrows, always recognizable by the white outer tail-feather (the next feather often largely white) and the red-brown shoulders (lesser wing-coverts), which give the bird the name of Bay-winged Bunting.

Distribution.—Eastern North America to the Plains, from Nova Scotia and Ontario southward; breeds from Virginia, Kentucky and Missouri northward.

This bird is generally distributed in open lands throughout the state from April to October, and nests abundantly, particularly in pasture lands and dry upland fields wherever the grass is not too long.

It arrives from the south from the last of March to the middle of April, according to latitude, having been observed at Petersburg as early as March 19, 1894, and at Detroit March 19, 1897, and March 20, 1892; even at Marquette it has been recorded by Miss Mowbray as early as April 10, and we have eggs in the College collection taken at Kalamazoo, April 27, 1879. In autumn the bird leaves the northern part of the state during September, but lingers in the southern counties always until November and occasionally later. From the time of its arrival until the first of August it sings almost constantly, and during the hot days of midsummer its pretty chant is one of the refreshing bird voices which is constantly heard. The song is difficult to describe, but is often mistaken by the novice for that of the Song Sparrow, which, however, it only resembles in a general way.

Its habit of singing from before sunset until dark has given the appropriate name of Vesper Sparrow, but it also sings freely at all hours of the day, even in the middle of the hottest days.

It is restricted mainly to the open country and is the characteristic bird of pastures, fields, roadsides and lanes, being always recognizable by the white tail-feathers, which show conspicuously as the bird flies away. It most often perches on a fence or a stone when singing, but frequently sings from the bare ground, and occasionally from the top of a tree.

The nest is made of weed-stalks and grasses of various kinds, sunk in a hollow scratched in the ground, and often with its upper edge nearly flush with the surface. The eggs are three to five, most often four, and are bluish or pinkish white spotted with brown and purplish, and frequently with a few dots or fine lines of black. They average .81 by .60 inches.

Probably two broods are reared by the great majority of the birds, and

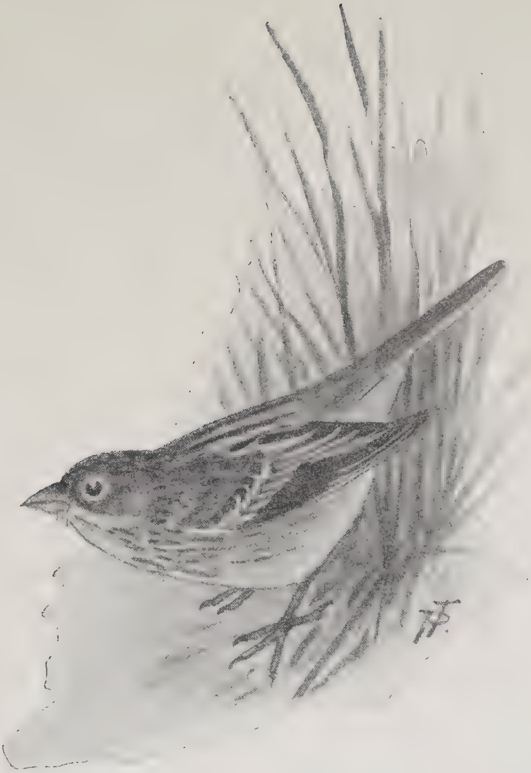

Plate XLVII. Vesper Sparrow.

From an original drawing by P. A. Taverner.

not infrequently three. We have a set of eggs from Montcalm county taken July 18, 1883, and another from Kalamazoo county taken July 26, 1890, both by Westnedge.

The food consists mainly of grass-seeds and weed-seeds, but insects are taken freely, particularly grasshoppers.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Upper parts brownish-gray, streaked with darker brown or blackish, the streaks narrower and sharper on the head (without median light stripe) and neck, broader and more diffuse on the back, almost wanting on the rump; under parts whitish, washed with buff across the breast and along the sides, these parts also streaked with brown or blackish, the streaks often tending to form a spot on the chest; middle of throat and belly unstreaked; a whitish or buffy stripe runs backward from the base of the lower mandible, bounded above by the dark auriculars and below by a series of narrow dark streaks along the sides of the throat; wings and tail brownish-black, the lesser wing-coverts (shoulders) bright reddish-brown or chestnut, the greater and middle coverts tipped with whitish; outer tail-feather mostly white, the next one usually with a little white; upper mandible brown, lower yellowish; iris brown. Young, similar to adult, but colors softer and markings not so sharp.

In late summer and autumn all the white areas (except possibly the throat) are strongly tinged with buff, and the tertiaries and secondaries are broadly edged with the same color.

Length 5.50 to 6.70 inches; wing 2.95 to 3.40; tail 2.40 to 2.75; culmen .38 to .45.

221. Savanna Sparrow. Passerculus sandwichensis savanna (*Wils.*). (542a)

Synonyms: Ground-bird, Field Sparrow (incorrect).—Fringilla savanna, Wilson, 1811. —Passerina savanna, Vieill.—Passerculus savanna, Bonap., B. B. & R., and many others. —Ammodramus sandwichensis savanna, Ridgw., 1885, A. O. U. Check-list, 1886, and most recent authors.

A small gray or gray-brown, streaked sparrow, similar in many respects to the Vesper Sparrow, but distinguished by the absence of the white outer tail-feathers and the almost invariable presence of a yellow line or area above the eye and a more or less distinct yellow edging at the bend of the wing.

Distribution.—Eastern North America, breeding from the northern United States to Labrador and Hudson Bay territory.

This pretty little sparrow is really a rather abundant migrant in all parts of Michigan, arriving between April 1 and 15, according to latitude, and departing from the northern part of the state in September or early October, but lingering indefinitely in the southern counties. Among the birds killed on lighthouses in Michigan waters it has been recorded more frequently probably than any other sparrow. It was reported from Spectacle Reef Light on thirty-four different dates, the earliest being April 23, 1889, and the latest October 4, 1893, the larger part of the dates falling in May and September. Although generally distributed during migrations, the bird seems to nest somewhat sparingly, or else very locally, since it is reported by most observers as not known to nest. However, we know that it breeds somewhat regularly in Wayne county (Swales, Taverner); St. Clair county (Swales, Taverner); at Grand Rapids and at Ann Arbor (R. H. Wolcott, L. J. Cole); near Lansing (T. L. Hankinson, L. J. Cole, and the author); Marquette (O. B. Warren); Isle Royale (Peet). It seems probable from these facts that the bird nests regularly at suitable places in all the intervening territory.

Its habits are somewhat peculiar; during spring and fall it keeps very closely on the ground, running like a mouse among the long grass (preferably in wet places), and when flushed flying rapidly and often in a zigzag manner, and dropping suddenly out of sight to run rapidly away again. There may be scores of the birds scattered through a meadow, yet the inexperienced collector will find but two or three. When nesting begins the male sings rather constantly and is often seen to perch on a low bush, a fence, or even a tree, and repeat his song at intervals of a few seconds for half an hour at a time. But the song itself is so feeble and so devoid of striking characters that it is not likely to attract attention.

The nest is doubtless variable in composition and location, but, from the fact that while with us the birds are found almost invariably in damp situations, we should expect the nest to be placed in low grounds, or at least very close to them, and this is the case in the few instances known to us. It is usually described as sunken to the rim in the ground, made of a few grasses and weed stems, and often completely hidden. The eggs are four or five, bluish-white, spotted with reddish brown, usually quite thickly. They average .78 by .56 inches.

From the early arrival of this species and the fact that Mr. Hankinson found a nest with young near the College, June 21, 1897, it seems likely that, like most other sparrows, it rears two broods; yet the fact that the male does not appear to sing after midsummer may indicate that a second nest is not a regular thing.

The food does not differ materially from that of other ground sparrows so far as we know.

TECHNICAL DESCRIPTION.

Outer tail-feathers longer than the middle ones.

Adult (sexes alike): Upper parts grayish or brownish-gray, thickly streaked with dark brown or black, the streaks on either side of crown so close together as to appear almost solid black and always leaving a distinct median stripe of grayish; a distinct yellow stripe from nostril over eye and backward, and a whitish stripe from base of lower mandible, bounded below by a dark line along the side of throat, and above by a similar line skirting the ear-coverts; chin and throat white or whitish, faintly or not at all spotted; chest and sides boldly streaked with brown or black; lower breast, belly and under tail-coverts white and unspotted; wings and tail blackish, all the feathers with narrow edgings of whitish on the outer webs; the bend of the wing distinctly yellowish. About one specimen in three has the chest streaks somewhat crowded together so as to form an indistinct spot. Autumn specimens are decidedly more brownish above, the sides of the head more buffy and frequently washed with pale yellow, while the tertiaries are broadly edged with buff or brown and sometimes the secondaries also; upper mandible dusky, lower yellowish; iris brown. Young birds are similar to adults, but usually browner, the markings not so sharp and distinct, and ordinarily without the yellow stripe over the eye.

Length 4.85 to 5.50 inches; wing 2.60 to 2.90; tail 1.90 to 2.20; culmen .38 to .43.

222. Grasshopper Sparrow. Ammodramus savannarum australis *Maynard.* (546)

Synonyms: Yellow-winged Sparrow.—Ammodromus australis, Maynard, 1887.—Fringilla passerina, Wilson, Bonap., Aud.—Coturniculus passerinus, Baird, Sclater, Allen, Coues, etc.—Ammodramus savannarum passerinus, Ridgw., 1885, A. O. U. Check-list, 1886, and most recent authors.

Streaked above but plain below, the edge of the wing bright yellow, and usually a distinct yellowish spot just in front of and above the eye.

Distribution.—Eastern United States and southern Canada, west to the Plains, south in winter to Florida, Cuba, Porto Rico and coast of Central America.

This little sparrow appears to be restricted to the southern half of the

Lower Peninsula, the northern limit being the Saginaw-Grand Valley. About Lansing it is by no means common, but it was observed between Lansing and Grand Ledge by L. J. Cole, in June 1898, and T. L. Hankinson found it not uncommon near the College, on May 30 of the same year. In the southern and southeastern part of the state it seems to be irregularly distributed, but not uncommon in some places. J. Claire Wood found a nest and four eggs in Wayne county, May 28, 1902. Mr. Purdy says it is increasingly abundant at Plymouth, Wayne county. Mr. Swales states that careful search has revealed it in a number of localities in Wayne, Oakland, Genesee, and St. Clair counties, but that it is extremely local in its distribution. Apparently it occurs in little communities, several pairs nesting within hearing of each other. At Petersburg, Monroe county, Mr. Trombley says it is tolerably common and breeds, and specimens have been taken rather frequently in Kalamazoo county in June and July.

The bird gets its name of Grasshopper Sparrow from the shrill whirring song, which is an insect-like trill closely resembling that of some grasshoppers, and not readily detected by every ear. Mr. Bicknell says: "It is most persistent in song in hot dry summers, when on the most fervid days its fine notes sound sibilant and insect-like about the parched fields" (Auk, I, 330).

It nests on the ground, laying three to five eggs, which are nearly white, rather sparsely speckled with brown and black, and more nearly resembling the eggs of some warblers than those of a sparrow. They average .73 by .58 inches.

This bird arrives from the south in April, early in the month in the southern part of the state, and from the middle to the end of the month in Ingham county. It seems to prefer somewhat bushy and decidedly barren grass lands more or less overgrown with weeds, briars, etc. Taverner states that he never found it at Port Huron, but that at Pearl Beach, St. Clair county, it is scarce and quite local.

TECHNICAL DESCRIPTION.

Outer tail-feathers a little shorter than the middle ones.

Adult (sexes alike): Top of head with a distinct whitish or buffy median stripe between two blackish ones; rest of upper parts brownish-gray, streaked with black (and sometimes chestnut), most broadly and heavily on the scapulars and middle back, more narrowly and sparsely on the neck and rump; a yellowish spot or short streak above the eye, and a more or less distinct dark line behind the eye; cheeks, throat, sides of neck, chest, sides and under tail-coverts, buffy white to clear buff, unspotted except for a few small streaks occasionally on the sides of chest; wings and tail brownish gray, edged externally with whitish but without any spots; the wing sometimes with two rather inconspicuous whitish bars across tips of middle and greater coverts; bend of wing bright yellow; bill brown above, yellowish below; iris brown. In worn midsummer plumage the reddish brown of the upper parts is mostly wanting and the buffy chest becomes soiled brownish. Young birds lack the red-brown back markings, the feathers being widely edged with buffy and whitish, the chest distinctly streaked with brownish or blackish, the yellow eye-spot indistinct or wanting.

Length 4.85 to 5.20 inches; wing 2.35 to 2.60; tail 1.80 to 2; culmen .40 to .47.

223. Henslow's Sparrow. Passerherbulus henslowi henslowi (*Aud.*). (547)

Synonyms: Henslow's Bunting.—Emberiza henslowii, Aud., 1829.—Fringilla henslowii, Nutt.—Coturniculus henslowi, Bonap., Baird, Coues, and most others.—Ammodramus henslowi, A. O. U. Check-list, 1886, and recent writers.

Plate XLVIII.

Similar in size and general appearance to the Grasshopper Sparrow, and, like that species, with the bend of the wing yellowish, but the under parts show distinct black streaks on the sides and breast, and two black lines between eye and throat.

Distribution.—Eastern United States, west to the Plains, north to southern New England and Ontario.

Henslow's Sparrow is one of the less common sparrows in Michigan and seems to be confined to the southern parts of the state. So far as we can learn it was first taken in the state by James B. Purdy, who found the nest with eggs at Plymouth, Wayne county, July 27, 1893 (Auk, XIV, 1897, 220). The nest was destroyed and the eggs broken by a mowing machine, but the bird was identified by Dr. C. W. Richmond of the National Museum, and enough of the eggs remained for identification by Captain Bendire. The following year (1894) a nest and eggs were taken in Jackson county, near Manchester, by L. Whitney Watkins, and the writer, accompanied by Mr. Watkins, took a second nest with four eggs at the same place June 6, 1904. Under date of June 11, 1908, Mr. B. H. Swales writes: "Henslow's Sparrow seems to be not uncommon in small colonies all over Wayne, St. Clair, and Oakland counties, as Taverner, Wood and myself have ascertained. I have found a number on Grosse Isle without special search." The bird has also been found in some numbers in Wayne county by J. Claire Wood and P. A. Taverner, and by Taverner and Swales near Pearl Beach and elsewhere in the southern part of St. Clair county. Specimens were taken also on June 26, 1907, by E. R. Kalmbach and H. A. Moorman, near Eaton Rapids, Eaton county, where a colony was located and evidently nesting, although no nests were found.

There are several records from western Ontario and it seems to be not uncommon on both sides of Lake St. Clair. It is by no means an easy bird to find, since it frequents wet grounds, often overgrown with long grass, weeds and shrubs, and it runs like a mouse among the thick herbage, flies rapidly and irregularly when flushed and is usually difficult to start a second time.

The nest is placed on the ground, and the two nests found in Jackson county were in very wet situations, the water being ankle deep at the time they were taken. The one recorded by Mr. Purdy was in mowing land and in a dryer situation. The nest is composed mainly of grasses, coarse externally and much finer within, is deeply hollowed and rather carefully hidden among the roots of the coarse grasses and weeds. The eggs, commonly four, are bluish white, flecked and speckled with reddish-brown, and, like those of the Grasshopper Sparrow, resemble some of the warblers, for example, the Maryland Yellowthroat, more than those of other sparrows. They average .74 by .57 inches.

The male has a rapid insect-like trill or song which is sometimes delivered while perched in plain sight on the top of a weed-stalk, or in a rosebush or

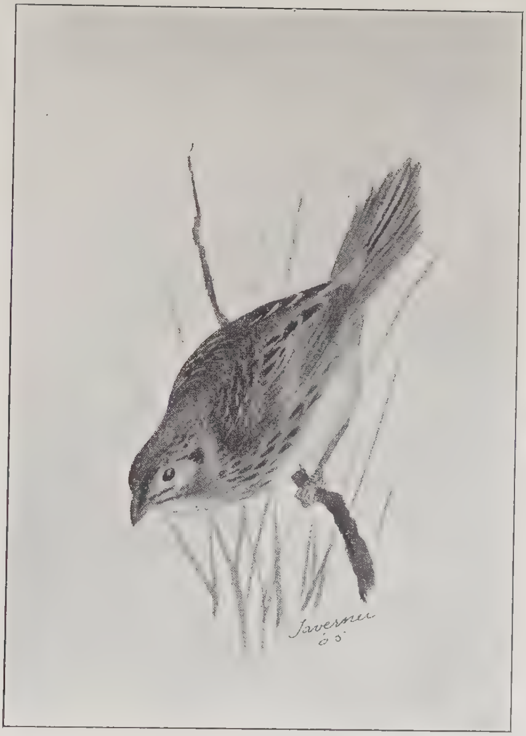

Plate XLVIII. Henslow's Sparrow.
From an original drawing by P. A. Taverner.

other small shrub, but also not infrequently while entirely hidden in the grass.

TECHNICAL DESCRIPTION.

Outer tail-feathers much shorter than middle pair.

Adult (sexes alike): Top and sides of head and neck greenish-olive, streaked narrowly with black except on middle of crown, which thus shows a clear pale stripe; a narrow black line from base of upper mandible around and behind the ear-coverts to the back of the eye, and a second black line bordering the white throat on each side; back, scapulars and rump mainly chestnut and black, each feather black centrally, surrounded by chestnut, and narrowly edged with white; breast and sides buffy, sharply streaked with black; belly white; wings and tail without bars or spots, the secondaries and outer tail-feathers mostly chestnut, the primaries and some of the tail-feathers dusky; bend of the wing yellow; bill brownish above, yellowish below; iris brown. Young: Similar to adult, but sides alone streaked, the breast without spots; only a single black streak from base of bill below eye (the one bordering the throat wanting).

Length 4.75 to 5.25 inches; wing 2.10 to 2.20; tail 1.90 to 2.05.

224. Leconte's Sparrow. Passerherbulus lecontei (*Aud.*). (548)

Synonyms.—Leconte's Bunting.—Emberiza leconteii, Aud., 1844.—Fringilla caudacuta, Lath., 1790, Nutt., 1832.—Ammodramus leconteii, A. O. U. Check-list, 1886.—Coturniculus lecontii, Baird, 1858, Coues, 1878.

Similar to Henslow's Sparrow, but without any yellow on the bend of the wing. The general appearance of the bird is decidedly more buffy or even yellow. Perhaps the most noticeable difference is in the smaller bill which is really minute for such a bird, the culmen measuring only .35 of an inch.

Distribution.—From the Plains eastward to Illinois and Indiana, and from Manitoba south in winter to South Carolina, Florida and Texas.

This is a western bird, only stragglers reaching eastward as far as Indiana, and possibly to southern Michigan. Our only record is a specimen in the Museum of the University of Michigan, said to have been taken near Ann Arbor. According to Kumlien and Hollister this species is sometimes fairly abundant in autumn near Lake Koshkonong, Wis., where in 1895 hundreds could have been taken. A few occur there every year in September, but none are found in spring (Birds of Wisconsin, p. 96).

The bird is said to be similar in its habits to Henslow's Sparrow and has a similar insect-like voice.

TECHNICAL DESCRIPTION.

Outer tail-feathers much shorter than middle ones; bill very small and slender.

Adult (sexes alike): "No dusky rictal or submalar streaks; median crown-stripe buff anteriorly, the rest pale buffy-grayish or dull buffy whitish; lateral stripes streaked blackish and brownish, the former usually predominating (nearly uniform black in summer); hind neck streaked chestnut and pale buffy or buffy-grayish; sides of head, including broad superciliary stripe, buffy (deeper, almost ochraceous, in winter, paler, sometimes nearly white in summer), the lores and ear-coverts light grayish or brownish, the latter bordered above by a blackish streak, becoming larger posteriorly; anterior and lateral lower parts buffy, the sides and flanks streaked with blackish; belly white; upper parts brownish, spotted or striped with blackish and streaked with whitish or buffy. Young: General color buff, deeper above, paler beneath, the belly whitish; upper parts streaked and striped with blackish, the chest, sides and flanks more narrowly streaked with the same.

"Length 4.40 to 5.50 inches; wing 1.87 to 2.06; tail 1.87 to 2.25; culmen about .35" (Ridgway).

225. Nelson's Sparrow. **Passerherbulus nelsoni nelsoni** (*Allen*). (549.1)

Synonyms: Nelson's Finch, Nelson's Sharp-tailed Finch.—Ammodramus caudacutus var. nelsoni, Allen, 1875.—A. c. nelsoni, A. O. U. Check-list, 1886.—Ammodramus nelsoni, A. O. U. Committee, 1899.

Somewhat similar to Henslow's Sparrow, but decidedly browner above and below, the throat, breast and sides strong buffy-brown with few or no streaks of black. Not readily identified except by the expert.

Distribution.—Fresh water marshes of the interior, from northern Illinois to North Dakota and Manitoba; south in winter to Texas and drifting eastward to the Atlantic coast during migrations.

This rare sparrow was first described in 1874 from specimens obtained in Calumet marsh, northeastern Illinois. Dr. Morris Gibbs states that on October 5, 1878, Mr. William Ely secured two specimens of Nelson's Sparrow, an adult female and a young male, in Kalamazoo county. The young specimen was preserved in the collection of G. B. Sudworth. Another specimen was shot near Detroit September 27, 1893, by J. Claire Wood, and is now in the collection of B. H. Swales, Grosse Isle.

The birds frequent wet places, and apparently prefer the margins of lakes, where they delight to run about among the bullrushes which fringe the shores or grow in the water. They are said to be abundant, sometimes exceedingly so, in September and October about Lake Koshkonong, Wisconsin, but no specimens are found in spring or summer. It has been found nesting near Devil's Lake, North Dakota, where E. S. Rolfe took a nest and five eggs, sunken in the wet earth and built of fine dry grass. The eggs were grayish-white, thickly sprinkled and clouded with brown, and average .65 by .50 inches.

TECHNICAL DESCRIPTION.

Tail much graduated, the feathers slender and acute, the outer pair much shorter than the middle ones.

Adult (sexes alike): "Crown without a distinct median pale stripe, at least anteriorly; edge of wing very pale yellowish, supraloral streak deep buff or ochraceous, like the rest of the very distinct superciliary stripe; malar stripe deep buff or ochraceous. Above olivaceous, mixed or glossed with ashy, the sides of the back streaked with ashy, buffy or whitish, the crown with two broad lateral stripes of sepia-brown enclosing a narrower and less distinct one of grayish; chest and sides more or less distinctly washed with buff or ochraceous (often deeply of this color) and streaked with dusky or grayish. Young: Above dull ochraceous, the back broadly streaked with black, and sides of the crown chiefly of the latter color; lower parts entirely buff, streaked on chest with dusky. Colors of upper parts usually very sharply contrasted, especially the chalky white streaks of back, as compared with the rich umber-brown ground color; chest and sides usually very deep buff or ochraceous and not very distinctly or sharply streaked with dusky. Length 4.80 to 5.85 inches; wing 2.12 to 2.35; tail 1.83 to 2.21; culmen .49 to .53" (Ridgway).

Males average somewhat larger than females.

226. Lark Sparrow. **Chondestes grammacus grammacus** (*Say.*). (552)

Synonyms: Lark Finch, Little Meadowlark.—Fringilla grammaca, Say, 1823.—Chondestes grammaca, Bonap., Baird, Allen, etc.—C. grammica, Brewster, Gibbs, Ridgway. and others.—Chondestes grammacus, A. O. U. Check-list, 1886, and most recent authors,

Figure 115.

The head, broadly striped with chestnut, white, and black, the small black spot in the center of the breast, and the rounded tail, most of the feathers broadly white-tipped, combine to mark this sparrow unmistakably.

Distribution.—Southern Ontario and Mississippi Valley region, from Ohio, Illinois and Michigan to the Plains, south to eastern Texas and northwestern Alabama. Accidental near the Atlantic coast.

This is a prairie sparrow which is said to have invaded Michigan from the west during the last thirty years, but which is just as likely to have been here in small numbers from time immemorial, extending its area, however, as the woods were removed and the country came under cultivation.

It is nowhere abundant in Michigan, but it is not rare as a summer resident in certain localities, although even there its numbers vary greatly from year to year. We have numerous records from Wayne, Washtenaw, Monroe, Lenawee, Jackson, Kalamazoo, Kent and St. Clair counties, all in the southern half of the state. The bird must be very local in its distribution, for the writer has sought for it carefully but unsuccessfully in Oakland, Genesee, Livingston, Eaton, Clinton and Ingham counties, in territory apparently just as favorable as the localities in Jackson, Washtenaw and Lenawee counties where it has been found. It is listed as common at Marquette, on the south shore of Lake Superior, by Miss Mowbray, although no specimens were taken, and it has not been found there by other observers. In the summer of 1906 Mr. W. M. Wolfe reported the Lark Sparrow nesting near Beulah, Benzie county. He writes: "With the Lark Sparrow I am fairly familiar, as with the Cardinal. It did not nest in the timber, but in the brush that grows abundantly on the wide beach of Crystal Lake. The eggs were characteristic. Its note led to its identification." With these two exceptions it has not been found north of a line through Grand Rapids and Port Huron, but since it ranges north to Manitoba, and is by no means uncommon over a large part of Minnesota, it is not improbable that it may yet be found in numbers in parts of the western half of the Upper Peninsula. Professor A. J. Cook recorded it from the Agricultural College (Birds of Michigan, 2d ed., 1893, p. 113), but we have been unable to find on what authority, and certainly it has not been seen there during the past eighteen years.

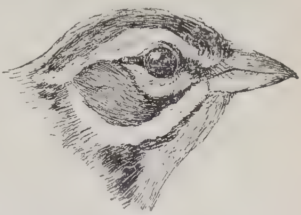

Fig. 115. Lark Sparrow. Reprinted from Chapman's Handbook of the Birds of Eastern North America, by courtesy of D. Appleton & Company.

In its habits and song it much resembles the Vesper Sparrow, and frequents similar open pasture lands, roadsides, and cultivated fields along the edges of orchards and woods. Ridgway speaks of its song in Illinois as resembling that of the Indigo-bird, but louder, clearer and more metallic. Its marked colors, and particularly the white in the tail, which invariably suggests the Mourning Dove, render it conspicuous wherever it occurs and it is not likely to be overlooked.

While it feeds mainly on seeds of grasses and weeds, it also eats many insects, particularly grasshoppers.

It appears to nest wherever found. Mr. Mark B. Mills records a nest with five eggs at Macon, Lenawee county, April 20, 1896, and Mr. Trombley took three eggs at Summerfield, Monroe county, May 7, 1889. We have a set of five eggs in our College collection taken by L. Whitney Watkins at Fairview Farms, Jackson county, May 20, 1896. The nest is most often placed directly on the ground, more rarely in a low bush, and is built of grasses and weed-stalks, and lined with various fibrous materials, usually including bristles or hair. The eggs are three to five, white or bluish white, rather thinly spotted with brown, purple and black, and usually with dark irregular pen-scratches. They average .80 by .61 inches.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Top of head with a median stripe of white or grayish-white, bordered on either side with a broader dark stripe, which is black on the forehead, bright chestnut on the crown, and mixed with black on the nape; a narrow black line through the middle of the lores, with a long white stripe above it and over the eye, and a shorter white stripe below it and the eye; ear-coverts chestnut, with black spots before and behind; a broad white stripe from the base of lower mandible along side of head, separated from the white throat by a narrow black stripe; back brownish gray, the scapulars and interscapulars streaked with blackish, the hind neck, rump, and upper tail-coverts mostly unstreaked; under parts white or grayish-white, the chest with a patch of five or six small black spots; wings grayish-black, edged with white externally, and with two more or less conspicuous whitish bars; tail rounded, all but the middle feathers black with broad white tips, the outer pair about half white, the amount decreasing regularly on the next four pairs, the middle pair brownish-gray without white tips; bill dusky above, bluish below; iris brown.

Young birds are more or less streaked with blackish on the breast, and the head markings are much less distinct, the crown entirely grayish-brown streaked with blackish, and the ear-coverts plain grayish-brown.

Length 5.75 to 6.75 inches; wing 3.20 to 3.80; tail 2.70 to 3; culmen about .45.

227. Harris's Sparrow. Zonotrichia querula (*Nutt.*). (553)

Synonyms: Fringilla querula, Nutt., 1840.—Fringilla harisii, Aud., 1843.—Zonotrichia querula of most other authors.

With the proportions and general appearance of the White-throat, but rather larger, the top of the head without any stripes, and mainly clear black in the adult, as is also the chin, throat and middle of the breast. In immature birds these black feathers are ashy on buff tipped, more or less hiding the black.

Distribution.—Middle United States from Illinois, Missouri and Iowa west to middle Kansas and the Dakotas, and from Texas north to Manitoba.

This appears to be a rather rare straggler from the west, yet from its similarity to the White-throat and White-crown, with which it associates, it may occur more frequently than we suppose. Thus far but three specimens have been recorded from Michigan, as follows: (1) An immature female shot at Palmer, Marquette county, September 30, 1894, by O. B. Warren; the skin now in the Agricultural College collection. (2) A male shot at Battle Creek, Calhoun county, October 12, 1894, by Edward Arnold; this bird was with a flock of White-throated Sparrows. (3) A female collected at Sault Ste. Marie, Chippewa county, February 22, 1900, by Richard Ryan, and identified by the Division of Biological Survey, U. S. Department of Agriculture. This specimen is now in the museum of the Sault Ste. Marie high school (Melville).

Mr. Warren states that he first noticed this species at Palmer in the fall of 1893 among flocks of the White-throated and White-crowned Sparrows and found it tolerably common in the fall migrations of 1894 and 1895, but was unable to find it in the spring.

It appears to be similar in its habits to the other members of the genus, but its nesting habits and eggs are imperfectly known.

TECHNICAL DESCRIPTION.

Adult: Whole top of head black, without lighter median stripe; rest of upper parts brownish-gray or grayish-brown, the scapulars and middle of back broadly streaked

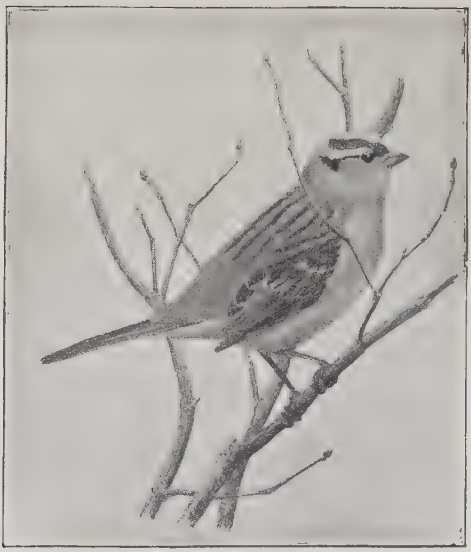

Plate XLIX. White-crowned Sparrow.

From North American Fauna No. 16. Biological Survey, U. S. Department of Agriculture.

with blackish, the rump and upper tail-coverts plain; lores black; sides of head grayish white or gray; chin and throat black, this color usually extending downward to the center of the breast; sides and flanks buffy brown, streaked with dark brown or blackish; rest of under parts white; wings and tail grayish-brown, the former with two white bars on the tips of the coverts, and the tertiaries and inner secondaries margined with chestnut; bill reddish, darker at the tip; iris brown. Young: Similar to adult, but the black of head much obscured by the gray feather tips, and that of the chin and throat largely replaced by white; usually there is some black visible on the chin and a second patch on the middle of the chest (sometimes reduced to a group of dusky streaks); the sides of head also are distinctly buffy or brownish.

Length 6.75 to 7.75 inches; wing 3.20 to 3.60; tail 3.30 to 3.75.

228. White-crowned Sparrow. Zonotrichia leucophrys leucophrys (*Forst.*). (554)

Synonyms: White-crown.—Emberiza leucophrys, Forster, 1772.—Fringilla leucophrys, Bonap., Nutt., Aud.—Zonotrichia leucophrys of most authors.

Plate XLIX.

A large, handsome sparrow with a broad milk-white stripe through the middle of the crown, bordered on each side by a stripe of clear black. The chin is white, and the throat and breast are continuous light gray.

Distribution.—North America at large, breeding chiefly in the Rocky Mountains, the Sierra Nevada and northeast to Labrador. South in winter to the Valley of Mexico.

A not uncommon spring migrant in all parts of the state; less often noticed in autumn. It associates more or less with the White-throats, but is frequently found in small parties of five to ten by itself. Mr. Swales records it near Detroit as early as April 27, 1889, and as late as May 21, 1899. Specimens were killed on Spectacle Reef Light frequently, the earliest May 6, 1887, and the latest May 28, 1892. Fall records at the same light are September 24 and 25, 1889 and October 5, 1890. In the southern part of the state it probably is more common in October than in September. At the Agricultural College it appeared May 8, 1897, and May 12, 1900.

There is a possibility that this sparrow nests in the northernmost parts of the state, but we have no positive record. Miss Mowbray says it is very common at Marquette from April 17 to September 20, which would indicate nesting, but neither O. B. Warren, E. A. Doolittle, nor the writer, has found it in that region, where the White-throated Sparrow breeds commonly; moreover, Major Boies did not find it nesting on Neebish Island, nor have any of the good observers at the Sault recorded it in summer. On the other hand it is known to nest not rarely in similar latitudes in Wisconsin and Ontario. It is said to nest on the ground, or in a low bush, and the eggs are described as varying in ground color from pale blue to pale brown, more or less thickly speckled with reddish brown. They average .85 by .61 inches.

Dr. A. K. Fisher, speaking of the song as heard during migration at Sing Sing, New York, says that it suggests that of the Meadowlark.

TECHNICAL DESCRIPTION.

Adult (sexes practically alike): Forehead and sides of crown velvet black, enclosing a broad stripe of pure white, which darkens into clear gray on the nape; a narrower white stripe starts above the eye and curves backward to the nape, being bounded below by a black line which starts just behind the eye; back ash-gray, streaked with dark brown, the rump and upper tail-coverts plain grayish-brown; chin and belly white; throat, sides of head and neck, and breast, clear ash-gray; sides and flanks buffy brown, without streaks; wings with two white bars; outer webs of tertiaries chestnut, tipped with white; tail-feathers brownish or dusky, unmarked; bill bright reddish-brown; iris brown. Immature: No clear black or white about the head, the forehead and sides of crown being rich brown, and the central stripe buff or fawn-color; a similar stripe behind the eye; gray of throat and breast duller and browner, the upper parts also much browner than in the adult.

Length 6.50 to 7.50 inches; wing 3 to 3.30; tail 2.80 to 3.20; culmen .38 to .45.

229. White-throated Sparrow. Zonotrichia albicollis (*Gmel.*). (558)

Synonyms: White-throat, Peabody Bird, White-throated Crown-Sparrow, Canada Bird.—Fringilla albicollis, Gmelin, 1789, Wilson, 1811.—Zonotrichia albicollis, Swains, 1837, and most writers.—Fringilla pennsylvanica, Aud.

Spring males have a narrow white stripe through the middle of the crown, one on either side, a distinct yellow spot in front of the eye, and a pure white chin and throat, sharply marked off from the grayish under parts. Females and young birds are duller and dingier, but there are always traces of the yellow eye spot, white throat and streaked crown.

Distribution.—Chiefly eastern North America, west to the Plains, north to Labrador and the Fur Countries. Breeds from Montana, northern Wyoming, northern Michigan, northern New York and northern New England northward, and winters from Massachusetts southward.

An abundant migrant throughout the state, and a common summer resident from the middle of the Lower Peninsula northward. Possibly a few individuals remain over winter in the southernmost counties, but this is not usual; few White-throats are to be found in the state from the last of October to the first of April. They enter the state from the south late in April, and the greatest movement takes place during the first half of May. Many have been killed every year on Spectacle Reef Lighthouse, some as early as April 23, 1889, and others as late as May 15, 1891. Autumn records at this lighthouse were September 24, 1889, September 29, 1887, and October 7, 1893. During migration they travel in loose flocks of a dozen to a hundred, and feed almost anywhere, except in perfectly open fields, seeming to prefer the edges of woods, roadsides, gardens and similar places. They get almost all their food from the ground, often scratching like a Junco or Chewink, and the food consists largely of grass seeds and weed seeds, though insects are eaten freely and large numbers are fed to the young.

We have been unable to fix definitely the southern limit of its nesting range, owing to the paucity of observers in many counties. It nests abundantly in suitable places north of the Saginaw-Grand Valley and sparingly in the northern half of that Valley. Probably a few pairs nest considerably south of that region, since it is said to have nested near Grand Rapids, and individuals have been known to spend the summer about Detroit. We have failed to find it, however, in summer in Ingham county. In the valleys of the Au Sable, Muskegon and Manistee it is one of the most abundant and characteristic summer birds, and the same is true of the entire Upper Peninsula.

The nest is usually placed on the ground, often at the foot of a small evergreen, and is generally sunken flush with the surface and well hidden by overhanging vegetation. More rarely the nest is placed in a bush or small tree, but this appears to be exceptional. Numerous observers in the northern part of the state have seen scores of nests on the ground, but never one elsewhere. Mr. E. A. Doolittle, however, writes that on July

6, 1906, he found a nest containing three eggs on Grand Island, Munising Harbor, placed three feet from the ground in a small balsam. The nest is much like that of other sparrows, and the eggs are four or five, bluish white or grayish, thickly covered with reddish-brown markings, sometimes fine, often coarse; they average .83 by .59 inches. Often if not usually, two broods are reared in a season, and the birds may be heard singing well into August.

The song is characteristic, and once heard is not likely to be forgotten. It is fairly well suggested by the words "sow-wheat, peabody, peabody, peabody," which is the song ascribed to it in New England, based on a pretty story to the effect that a farmer named Peabody, doubtful as to the proper time for sowing his wheat, was led to sow at once by hearing the song of this bird at every corner of the field. Reaping a bountiful harvest that year, he waited for the song of the bird in following seasons and his neighbors eventually named the bird "Peabody's Bird." There is very great variation in the songs of individual birds and it is hard sometimes to make out the above song. A fisherman friend declared that he never lost a fine trout in a Michigan stream that he did not hear a little bird in the neighboring swamp call "Oh dear, dear, dear, dear!" The song is peculiarly clear and penetrating, and is heard at all hours of the day, and frequently during the night. Seaton Thompson states that the White-throat is so well known as a night singer that in many parts [of Manitoba] he is called the Nightingale, and adds that he should not be surprised to find that the bird also had an air song. We have no reason to suppose, however, that this bird ever sings on the wing.

TECHNICAL DESCRIPTION.

Adult (sexes nearly alike): Top of head with a narrow median white stripe between two broader black ones; a bright yellow stripe from nostril to above the eye, where it changes to white and runs backward toward, but not to, the nape; below this stripe is a narrow black one which starts behind the eye and ends on a line with the other five; chin and upper throat pure white, usually edged with a narrow dusky line and surrounded by the deep ash-gray which covers the sides of the head and neck, lower throat and chest, and in many specimens extends along the sides; belly pure white; back warm brown or chestnut, streaked with black, except on rump and upper tail-coverts; wings and tail similar to those of the two preceding, but browner, especially the secondaries and wing-coverts; bend of the wing bright yellow; bill dusky or bluish; iris brown. Immature: At first without yellow on head or bend of wing; the head with light brown in place of pure white, and the under parts except chin and belly, thickly streaked with dusky; later the streaks disappear more or less completely, and a little yellow appears over the eye and on the wing, but the distinctive head markings (including the white throat) do not develop until the bird is at least a year old, and many breed before attaining them.

Length 6.30 to 7.65 inches; wing 2.80 to 3.15; tail 3.05 to 3.35.

230. Tree Sparrow. Spizella monticola monticola (*Gmel.*). (559)

Synonyms: Winter sparrow, Winter Chippy, Canada Sparrow.—Fringilla monticola, Gmelin, 1789.—Fringilla canadensis, Nutt., Aud.—Fringilla arborea, Wils.—Spizella monticola of most authors.

Similar to the Chipping Sparrow, but larger; crown chestnut, unstriped; breast grayish with a small blackish spot in the center; two white wing bars.

Distribution.—Eastern North America, west to the Plains, and from the Arctic Ocean south in winter to the Carolinas, Kentucky and eastern Kansas. Breeds north of the United States, east of the Rocky Mountains.

Next to the English Sparrow this probably is our most abundant and universally distributed winter bird. It comes to us from the north in October, usually after the middle of the month, and may be found in varying numbers all through the winter and until at least the middle of April, after which it passes rapidly northward beyond our borders. Whether this bird is less abundant in Michigan in winter than in the other northern states we cannot say, but it is certain that during midwinter very few are seen here compared with the thousands which winter in the New England states, and, according to other observers, in Iowa and Nebraska. Apparently the greater number pass entirely south of the state in winter, since the species is much more abundant in November and March than at other seasons.

During its stay it feeds almost entirely upon grass seed and weed seed, and examinations made by the U. S. Department of Agriculture show that probably each bird consumes at least one-fourth of an ounce of such seed per day. Upon this basis, counting ten Tree Sparrows to an acre, it has been estimated that they destroy during a season, in the state of Iowa alone, 1,750,000 pounds, which equals 875 tons, of weed seed (Beal, Farmers Bulletin No. 54, p. 28).

While with us it associates frequently with the Juncos, and is oftenest found in flocks of 25 to 100 individuals. It has been reported to nest in the northern part of the state, but there seems to be no evidence whatever that this is the case. In fact, the bird is not known to nest within the limits of the United States, but is a summer resident of Arctic and Sub-arctic America, never remaining in Michigan through the summer. Wood and Frothingham state that they saw a single one with a flock of Juncos in Iosco county on August 6, 1904 (Auk, XX, 45). This is an extraordinarily early record and seems likely to have been based on a mistaken identification, as the specimen was not taken.

The nest, in the far north, is placed either on the ground or in low bushes, is composed of dry grasses, feathers, etc., and the eggs are three to five, similar to those of the White-throated Sparrow, but averaging .75 by .58 inches (Ridgway).

TECHNICAL DESCRIPTION.

Adult (sexes alike): Top of head, stripe behind eye, and often a short streak from base of lower mandible, chestnut; rest of head and neck all round ash-gray, washed with brownish at back of neck; middle of back and scapulars reddish brown, streaked with black; rump and upper-tail coverts plain brownish-gray; under parts mostly plain, dull ash-gray, browner on the sides and flanks, nearly white on the belly; middle of breast with a small but distinct dusky spot; two conspicuous white wing-bars, and the tertiaries black with wide rusty or chestnut margins, which often become pure white near the tips; tail-feathers dark gray or dusky, unmarked except for narrow white or whitish edgings on the outer webs; upper mandible and tip of lower blackish; rest of lower mandible yellow; iris brown. In autumn and in immature birds the lower parts are usually strongly washed with buff, even on the belly and under tail-coverts. Young: Similar, but with top of head streaked with blackish and brown, the sides of neck with narrow dark streaks, and the chest also streaked with dusky. Length 6 to 6.50 inches; wing 2.80 to 3.10; tail 2.60 to 2.90.

231. Chipping Sparrow. Spizella passerina paserina (*Bech.*). (560)

Synonyms: Chippy, Chip bird, Hair-bird, Hair Sparrow.—Fringilla passerina, Bechstein, 1798.—Fringilla socialis, Wils., Nutt., Aud.—Spizella socialis, Bonap., 1838, and most recent authors.—Spizella domestica, Coues, 1875, Ridgw., 1881.

Plate L.

A small sparrow with reddish-brown crown, bordered just above the eye by a gray streak, and with a black line through the eye. The under parts are ashy gray without spot or streak.

Plate L. Chipping Sparrow.

From an original drawing by P. A. Taverner.

Distribution.—Eastern North America, west to the Rocky Mountains, north to Great Slave Lake and south to eastern Mexico; breeding from the Gulf States northward.

This familiar little sparrow is too well known to require any extended description. It nests abundantly in all parts of the state, showing, however, a decided preference for the cultivated regions and a decided liking for the society of man. Were it not for the ever-present English Sparrow and the far too abundant cat this bird would be found in every dooryard in the state where there were a few shrubs and trees. It arrives from the south in April; from the 3d to the 12th in the southern counties, from the 5th to the 15th at Lansing, and from the 25th of April to the 5th of May at Sault Ste. Marie. Its departure in the fall has not been so accurately noted, but it probably leaves the northern counties before the middle of September and the southern counties before the first of November. Mr. Swales states that he has seen it near Detroit as early as March 29, 1891 and as late as October 25, 1893, but that the bulk of the species leaves much earlier.

It commonly rears two broods, nests with eggs being found about the middle of May and again about the first of July. The nest is placed usually in a shrub or tree, small evergreens being preferred, but it is sometimes found high in an apple tree or an oak, and not infrequently in a tangle of vines or even on a lattice or the cornice of a house. It is always compactly built of grasses, weed-stalks and roots, and so invariably and heavily lined with hair as to have given the bird the name of "Hair-bird."

The eggs are commonly three or four, of a beautiful blue-green color, thinly spotted and lined with brown and black, often wreathed at the larger end. They average .69 by 50 inches.

The young birds when able to fly differ noticeably from the adults, being thickly streaked below so that they are often mistaken for other species. Old and young often collect in flocks in late summer and mingle more or less with other species.

The song is a peculiar trill which is very variable, sometimes justifying the usual description "like the sound made by striking two small pebbles together rapidly," but at other times it consists of a succession of more musical notes uttered at somewhat longer intervals and not distantly suggesting the song of the Junco.

The food of the Chipping Sparrow is very varied, consisting largely of grass-seed and weed-seeds, but also of other vegetable substances, including a few berries and the buds and leaves of chickweed and other herbaceous plants. It eats a variety of insects with relish, including grasshoppers, beetles, bugs and caterpillars, and when feeding young it gathers immense numbers of span-worms and other injurious insects. It is not known to do any harm whatever; on the contrary it is one of the best friends of the agriculturist and should be encouraged and protected everywhere. It suffers much from the English Sparrow, the Blue Jay, the Cowbird, and the domestic cat, but in spite of all these enemies it remains one of our most familiar and abundant birds.

TECHNICAL DESCRIPTION.

Adult in summer (sexes alike): Tail decidedly shorter than wing; forehead black; crown bright reddish brown or chestnut, without streaks and usually without trace of median pale stripe; a whitish or light gray line from nostril over and behind the eye, and a narrow black line across the lores and continued behind the eye; sides of head and sides and back of neck clear ash, more or less streaked with black on the hind-neck; middle of back and scapulars rusty brown, streaked with black; rump and upper tail-coverts plain gray; under parts plain light gray, darkest on breast and sides, nearly white on throat and belly; wings and tail brownish-gray, the wings with two narrow bars of white or buffy white, the tail unmarked; bill entirely black; iris brown. In winter or late autumn the colors become duller, the reddish crown often streaked with blackish, the under parts washed with brownish, and the bill brown. Young: At first the crown is light brown, narrowly striped with blackish, and the entire under parts are streaked with whitish and dusky; later the streaks beneath disappear, but the streaked crown is retained, together with a broad whitish stripe over and behind the eye. Length 5. to 5.85 inches; wing 2.55 to 2.90; tail 2.20 to 2.60.

232. Clay-colored Sparrow. Spizella pallida (*Swains.*). (561)

Synonyms: Emberiza pallida, Swainson, 1831.—Emberiza shattuckii, Aud., 1843.—Spizella pusio, Sharpe.—Spizella pallida of most authors.

In coloration somewhat resembling an immature Chipping Sparrow with unstreaked under parts, but in proportions of wing and tail much like the Field Sparrow, that is, with the wing about the same length as the tail or even shorter. Only to be identified by the expert.

Distribution.—Interior of North America, from Illinois and Iowa west to the Rocky Mountains, Arizona, etc., and north to the Saskatchewan Plains. Breeds from Iowa and Nebraska northward.

This is a western sparrow which appears to enter Michigan merely as a straggler during migrations. It has been reported several times from different parts of the state, but on investigation most of these records have proved to be incorrect. The only Michigan specimens known to us at present are one taken by P. A. Taverner, at Port Huron, St. Clair county, May 2, 1901, and now in the collection of J. H. Fleming of Toronto, and one taken on Isle Royale, Lake Superior, August 25, 1904, by W. A. Maclean, and now in the University Museum at Ann Arbor. This latter specimen was identified by H. C. Oberholzer, Washington, and the writer also has examined it. Mr. Norman A. Wood who was in charge of the party when this bird was taken, states that another was seen on the following day, and one each on August 28 and 31.

In general appearance and habits this species shows an odd mixture of the peculiarities of the Chipping Sparrow and Field Sparrow, nesting very near the ground and usually away from human habitations, but resembling the Chipping Sparrow somewhat in coloration, and its song lacking entirely the musical qualities of the Field Sparrow's. Seton Thompson describes its song as "A sound like a fly in a newspaper, 'scree-scree-scree,' sometimes giving but one note and at other times in the height of the season repeating the dulcet five or six times." Mr. Currier, describing its habits at Leach Lake, Minn., speaks of its song as "A buzzing, rasping noise, a little like the song of the cicada, but not so musical and given with more vigor. A friend * * * would call the bird nothing but the 'Rasper.'"

The nest is placed in low bushes, often within a few inches of the ground. The eggs are three to six, light greenish blue, speckled with brown, mostly at the larger end, and averaging .66 by .49 inches.

Since this species occurs regularly, though not very abundantly, in parts of Wisconsin, and plentifully in northern Minnesota, it is not impossible that it may prove to be a regular migrant, or possibly even a summer resident, in the western half of the Upper Peninsula, but as yet we have nothing to warrant such a belief.

TECHNICAL DESCRIPTION.

Adult in summer (sexes alike): "Wing and tail about the same length, the tail usually a little longer; upper parts without any rusty; top of head pale raw-umber brown, broadly streaked with black and divided by a distinct median stripe of light brownish-gray; light brown ear-coverts bordered above by a very distinct postocular streak of dark brown or dusky, and along lower edge by a rictal streak of the same; whitish malar streak usually bordered below by a more or less distinct grayish or brownish streak along each side of throat; hind neck and sides of neck ashy, in more or less marked contrast with brown of ear-coverts and crown; back light brown, broadly streaked with black. In winter the colors much browner, obscuring gray of neck and strongly tinging chest and sides. Young: Upper parts more buffy or 'clay-colored,' with blackish streaks broader and less sharply defined; dusky postocular and rictal streaks less distinct (sometimes nearly obsolete); chest, sides and flanks, streaked with dusky.

Length about 5 to 5.75 inches; wing 2.20 to 2.50; tail 2.30 to 2.60" (Ridgway).

233. Field Sparrow. Spizella pusilla pusilla (*Wils.*). (563)

Synonyms: Field Chippy, Bush Sparrow, Ground-bird, Ground Sparrow.—Fringilla pusilla, Wilson, 1810.—Emberiza pusilla, Aud.—Fringilla juncorum, Nutt.—Spizella agrestis, Coues, 1875.—Spizella pusilla, Bonap., 1838, and most recent authors.

Resembles both the Chipping Sparrow and the Tree Sparrow, but the entire bill is reddish yellow, there are two conspicuous whitish wing-bars, and the tail is longer than the wing. The head and back are reddish brown, the latter streaked with blackish, and the under parts are ashy or soiled white without any dark breast spot.

Distribution.—Eastern United States and southern Canada, west to the Plains, south to the Gulf States and Texas. Breeds from South Carolina, southern Illinois and Kansas northward.

The Field Sparrow is a common summer resident of old pastures grown up to woods, and the edges of woods, throughout the southern half of the state. It is one of the species very frequently confounded with others, and in trying to map its exact distribution in the state the utmost difficulty has been found. We have scattering reports of its presence not only all over the Lower Peninsula, but from half a dozen points in the Upper Peninsula, most of which are undoubtedly erroneous. We have perfectly reliable reports from all the southern part of the Lower Peninsula as far north as Bay county and Newaygo county, about 43½°, and it was also found sparingly in Crawford and Oscoda counties, by Wood and Frothingham, in 1904. Mr. S. E. White states that from 1889 to 1891 it was fairly common as a summer resident in certain localities on Mackinac Island. Probably this must be considered one of its northernmost breeding places, for the writer has searched for it personally in half a dozen places in the Upper Peninsula without success, and among the thousands of birds killed on Spectacle Reef Light in northern Lake Huron, the Field Sparrow has never been found. Blackwelder lists it from Iron county (Upper Peninsula) with the remark that it is common only in the more settled regions where there are open fields and hedges (Auk, XXVI, 369); Ruthven and Gaige failed to find it in Dickinson county in the summer of 1909 (MS. Report). Like half a dozen other sparrows it is known as "Ground Bird" and "Field Sparrow," and probably the reports from the Upper Peninsula relate to the Savanna Sparrow, Tree Sparrow, Chipping Sparrow and Vesper Sparrow.

It arrives from the south in April, the first part of the month in the southern sections of the state, and the latter part farther north. Mr. Swales gives his earliest spring record near Detroit as March 19, 1903, and his latest record in the fall, October 19, 1889. Our spring records for about a score of localities in the southern part of the state are all for the first half of April, the great majority falling between the 4th and the 14th. It ordinarily moves southward during September, and few are found in the state after October first. There is no record of its wintering in Michigan. While migrating it travels in small companies or loose flocks, but soon after its arrival in spring the pairs separate and nesting begins.

The first nest is built commonly before the first of June, dates for fresh eggs ranging from May 8 to June 3, while a second brood is reared late in June or early in July. Mr. Westnedge took three eggs on July 20, 1890, in Kalamazoo county, and Dr. Wolcott records a nest with eggs at New Baltimore, St. Clair county, July 23, 1893. The nest is neatly and compactly built of fine grasses, roots and hair and is usually lined with horse hair or cow's hair, but sometimes we find only grass. It is placed either on the ground or in a low bush, rarely more than three or four feet from the ground, although we have seen the nest twelve feet from the ground in an old apple tree. The eggs are three to five, whitish, thickly sprinkled with reddish brown, and average .68 by .51 inches.

The food resembles that of other ground-feeding sparrows, combining a large amount of weed and grass seed with a considerable number of insects, especially while feeding the young.

The bird is somewhat famous for its sweet and plaintive song, which perhaps has been a little overrated. Mr. Hoffman speaks of it as follows: "The song is a fine strain, beginning with two or three high, sustained, piercing notes, then running into a succession of similar, more rapid notes, all in a minor key, and often running down, or occasionally up, the chromatic scale. Sometimes the last rapid notes rise, and occasionally one note is repeated throughout. A beautiful form of the song, often given towards evening, is made by a repetition of the whole in a different key as soon as the first part is ended" (Birds of New England and Eastern New York, p. 160). John Burroughs says its song is like the words "fe-o, fe-o, fe-o, few-few-few, fee-fee-fee, uttered at first high and leisurely, but running very rapidly toward the close which is low and soft."

TECHNICAL DESCRIPTION.

Adult (sexes alike): Very similar to the Tree Sparrow (No. 230), but readily separable by the smaller size, lighter tints (rusty instead of chestnut above), absence of the dusky spot on the breast, and the wholly reddish-yellow bill. Tail about the length of wing, usually a little longer; top of head rather pale rusty brown, usually but not always with an imperfect median stripe of grayish; a narrow stripe of rusty behind the eye, expanding into a spot on the side of the neck; middle of back and scapulars rusty, like top of head, but streaked with blackish and grayish-white; rump and upper tail-coverts plain gray; under parts shading from grayish on throat and chest to brownish-gray on sides and flanks, and pure white on belly and under tail coverts; wings and tail precisely as in the Tree Sparrow, except perhaps a little paler brown on secondaries and tertiaries, and the wing-bars a little narrower; bill wholly reddish-yellow; iris brown. Young: Very similar to adult, but head markings less distinct, colors duller and more blended, and breast and sides streaked with blackish.

Length 5.10 to 6 inches; wing 2.45 to 2.70; tail 2.50 to 2.80.

234. Junco. Junco hyemalis hyemalis (*Linn.*). (567)

Synonyms: Slate-colored Junco, Snowbird, Common Snowbird, Slate-colored Snowbird, Blue Snowbird, Black Snowbird, White-bill.—Fringilla hyemalis, Linnæus, 1758, Bonap., Sw. & Rich., Aud.—Fringilla nivalis, Wils., Nutt.—Junco hyemalis of most authors.

Figure 116.

Mainly slate-colored, the under parts from lower breast to tail white; two outer pairs of tail-feathers pure white and the third pair largely so; bill pink or nearly white.

Distribution.—North America, chiefly east of the Rocky Mountains, breeding from the higher parts of the Alleghanies and the mountainous parts of southern New England northward. South in winter to the Gulf States.

An abundant migrant throughout the whole state, a common summer resident of the northern half, and a winter resident of the southern half. In the preceding sentence the word half really includes in both cases much more than half the state. The Snowbird nests commonly in all suitable places from latitude 44° northward, more abundantly, however, in the higher counties of the Lower Peninsula and the whole Upper Peninsula. South of 44° it nests here and there, probably with some frequency as far south at least as 43° and occasionally even farther. It was seen by Dr. R. H. Wolcott gathering material for nest-building at Grand Rapids, Kent county in June, and Dr. Atkins included it among the birds known to breed at Locke, Ingham county, in 1883. Miss Harriet H. Wright, of Saginaw writes: "I found two Junco nests at Bay Port, Huron county, June 1906. One found June 4th contained three birds, the other, found June 12th, four eggs. There must have been more birds nesting as I would see a number of birds at a time at the edge of the water where the fish flies had washed up." On the other hand, although it is given as a winter resident by most observers in the state, it is certain that by far the greater number of Juncos pass entirely out of the state on their southward migration, returning, however, in early spring. During mild winters large numbers remain in the southern half of the state, but ordinarily it is found only in small flocks or little parties, or not at all, during December, January and February. Mr. Swales states that in the neighborhood

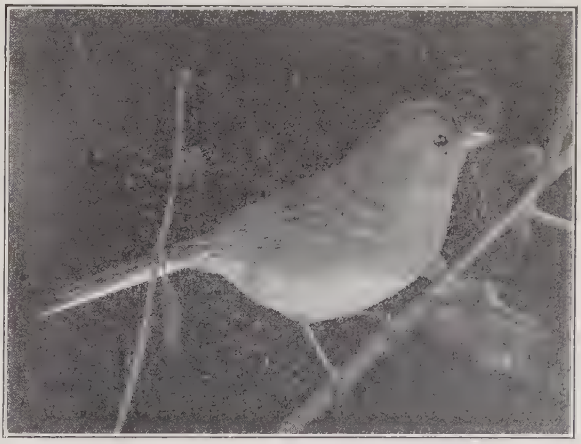

Fig. 116. Junco; Snowbird.
Photograph from mounted specimen.
Courtesy of Wm. T. Shaw.

of Detroit it generally appears in numbers from the north about the 15th of October, and he has seen them as late as May 7 (1889) in the spring, but the middle of April generally sees the departure of the bulk. While with us it is rarely seen singly, and even when nesting, at least at the north, several nests are likely to be found in the same vicinity.

It gets almost its whole food from the ground, where it searches for seeds of various kinds, and scratches among the fallen leaves and grass in search of seeds and insect larvæ and pupæ. While it frequents the open fields and pastures during migration, it is much more apt to be found in numbers about the borders and corners of fields, along the edges of woods, and in brushy or weedy ravines where its favorite food is abundant. It seems to be very fond of searching the ground in the shade of large trees, and in the semi darkness of such places the white tail-feathers are quite conspicuous as it flits back and forth.

Nests are found most often in June, but eggs are laid in May, June and July, and it seems certain that two broods are reared each season. The nest is placed on the ground invariably, so far as we know, and is often more or less hidden beneath a fallen log, a tuft of grass or a heap of brush. It consists of grasses and various fibrous materials which form a compact, snug and deeply hollowed receptacle for the eggs. These are three to five, nearly white, speckled with reddish brown, and average .76 by .58 inches.

Its ordinary song is a prolonged, clear trill, which apparently is the repetition of a single note, but which is much more musical than the song of the Chipping Sparrow which it somewhat resembles. Mr. Bicknell says it has also a "faint, whispering warble, usually much broken, but not without sweetness, and sometimes continuing intermittently for many minutes. It seems to slip into this very readily from a simple chirping, and is always the song with which the species begins the season. I have heard both of its songs in October and November."

An impression is current among country people in Michigan, as elsewhere, that the Blue Snowbird changes in the summer into a "Ground Bird" or sparrow, which changes again in the fall into a slate-blue winter bird. Of course this belief has no foundation in fact. In reality the seasonal changes of plumage in the Junco are much slighter than in most other birds of the group. It is perhaps a little browner or grayer in winter and the slate becomes a little blacker and the white a little purer during the nesting season.

TECHNICAL DESCRIPTION.

Adult male: Entire upper parts slate-gray, darker on the head, usually almost black on the forehead, often with a brownish gloss on the middle of the back; sides of head, throat, breast and sides slate-colored, like the back but a little lighter, or ash-gray on sides and flanks; belly and under tail-coverts pure white; wings and tail dark slate-gray, the former without any trace of bars, the latter with the two outer pairs of feathers pure white, and the next pair partly so; bill light pinkish or flesh-color; iris brown. Adult female: Very similar to male, but the slate-color of upper parts never so dark, and always washed with brownish on the back and usually with rusty on edges of tertiaries; sides often strongly tinged with light pinkish brown. Young: At first entirely streaked above and below; above with brownish and black or slate, below with blackish and brown on a whitish ground. Later, the streaks are lost and the young resemble the females, but are much browner, the wings often showing two rusty bars, and the secondaries and tertiaries edged with buff or brown.

Length 6 to 7 inches; wing 2.98 to 3.25; tail 2.60 to 2.90; culmen .46 to .51.

Note.—For accounts of other species of Junco, said to occur in Michigan, see Appendix.

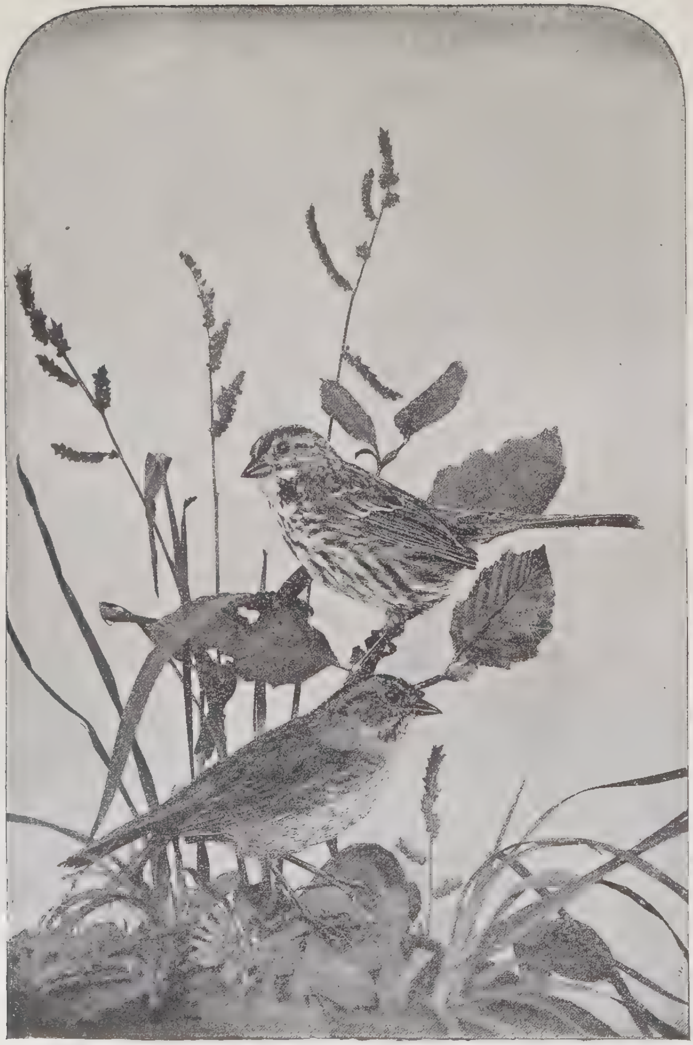

Plate LI. Song Sparrow (upper figure). Swamp Sparrow (lower figure).
Reprinted from Chapman's Handbook of Birds of Eastern North America.
By courtesy of D. Appleton & Co.

235. Song Sparrow. Melospiza melodia melodia (*Gmel.*). (581)

Synonyms: Ground Sparrow, Ground-bird, Hedge Sparrow, Bush Sparrow.—Fringilla melodia, Wilson, 1810, Bonap., Aud., Nutt., 1832.—Fringilla fasciata, Gmel., 1788.—Melospiza fasciata, Scott, 1876, A. O. U. Check-lists, 1886, 1895.—Melospiza cinera melodia; Ridgw., 1901.

Plates LI, LII, and Figure 117.

Brown or reddish-brown above, ashy or whitish below, but everywhere streaked with brownish black, the streaks tending to run together and form a large patch or spot in the middle of the breast.

Distribution.—Eastern United States to the Plains, breeding from Virginia and the southern portion of the Lake States northward to the Fur Countries.

This familiar little bird is well distributed in summer over the entire state, and under one or another of the above names is well known to almost every dweller in town or country. It is not resident in any considerable numbers, even in the southernmost parts of the state, yet each winter a few individuals may be found in sheltered places in the southern half of the Lower Peninsula, and in exceptionally mild winters scattering flocks of a dozen individuals are seen. The presence of these interferes somewhat with the records of spring migration, since these birds which have wintered begin to sing in February or early March, in fact may sing in bright weather during any day in winter.

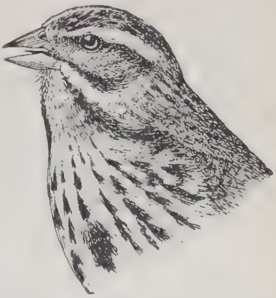

Fig. 117. Song Sparrow. From Hoffmann's Guide to the Birds. Houghton, Mifflin & Co.

Song Sparrows appear in numbers in the southern part of the state about the middle of March, and from this time until the middle of April they are moving northward in large numbers. It is one of the species most often killed at lighthouses and we have records from Spectacle Reef Light, Lake Huron, for April 12, 17, 23, 1890, also for May 15, 1890 and September 4, 1893. It arrived at Palmer, Marquette county, April 15, 1894, and April 5, 1895, and at Sault Ste. Marie April 21, 1899.

It is found in almost every conceivable place except open pasture lands, but shows a decided preference for the neighborhood of water and is most abundant in the bushes along streams, about the margins of ponds, along the edges of wet woods, and in bushy meadows. In such situations it is seen flitting from bush to bush, or more commonly the male is seen perched on the top of a bush or fencepost chanting his simple little song from morning till night. Hoffman says of the song "It is subject to endless variation in the species, and varies to a considerable degree even in the same individual, but it commonly begins with three brisk notes or pairs of notes 'whit, whit, whit,' or 'o-lit, o-lit, o-lit,' and in the middle of the song there is apt to be a harsh burring note, after which the song quickly runs out to some ending." Bicknell says "It sings with greater constancy through the seasons, and with less regard to adverse weather, than any other of our song birds. All through the hottest summer weather it is songful, though the oppressive days of late August seem sorely to try its spirit; but it recovers its cheerfulness with advancing autumn and is one of the few birds which, in that season, repeat the full chorus of the spring."

It always rears two broods, and possibly sometimes three, for nests with eggs are found as early as April 15, in the southern part of the state, and again in June and even in July. The earlier nests are commonly placed on the ground, perhaps because the scanty foliage at this time fails to hide the nest, but in regions where evergreens are abundant the early nests are frequently placed in these, and the later ones also. As a matter of fact nests are found on the ground, in bushes or brush heaps, and occasionally in orchard or shade trees even twenty feet from the ground. The nest is bulky and consists mainly of grasses and weed-stalks usually with a thick lining of horse hair. The eggs are three to six, extremely variable in ground color and markings, but always spotted with brown or black on a bluish, greenish or white background. They average .79 by .59 inches.

Probably this species rears more Cowbirds than any other bird which we have; it is also one of those which not infrequently rears one or two of its own young in addition to a young Cowbird, a feat which is impossible for many of the smaller birds.

The food of the Song Sparrow is very variable, but while it eats many seeds of weeds and grasses, living mainly on such seeds in winter, it consumes an immense number of insects, on which the young are almost entirely fed. It is rather fond of small wild fruits, and we have seen it take a bite from a cultivated cherry or strawberry, but this is by no means a common habit. Among the insects consumed are large numbers of span-worms, cut-worms and other lepidopterous larvæ, as well as vast numbers of grasshoppers and other injurious forms. On the whole, we have no common bird which is more uniformly beneficial to the agriculturist and which at the same time is so confiding and sweet-voiced. It is much to be regretted that it sufficiently resembles the English Sparrow in size and color to be mistaken by the careless for that bird, and undoubtedly thousands of these valuable and innocent birds have been killed for the bounty which Michigan has unwisely offered for so many years on the English Sparrow.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Top of head brown, streaked with deeper brown or blackish, and divided by a median stripe of light grayish which is very narrow on the forehead and much wider on the occiput; a similar ashy stripe over the eye, and most of the ear-coverts of the same color, the latter usually distinctly bordered with brown or blackish; chin and throat white or whitish, bordered on either side by a series of dark brown or blackish streaks, which in turn are separated from the ear-coverts by a light gray or whitish stripe; upper parts brownish gray, heavily streaked with dark brown or blackish on the middle back and scapulars, and elsewhere with light brown; under parts white or buffy white, the breast and sides streaked and spotted with dark brown or blackish, the spots usually arrow-shaped, and commonly thickest in the middle of the breast where they form a more or less distinct spot; wings brownish, with little or no trace of bars, the secondaries reddish brown on their outer webs, the tertiaries mainly black, with broad chestnut or rufous margins which become white toward the tips; tail-feathers reddish-brown, the middle pair usually with blackish shaft-stripes, and indistinctly barred with dusky; bill brownish above, yellowish below; iris brown. Autumn specimens are browner or more buffy, especially on chest and sides. Young birds are similar, but with all the colors more blended, the dark markings less sharply defined.

Length 6 to 6.75 inches; wing 2.45 to 2.80; tail 2.58 to 3.02; culmen .50 to .54.

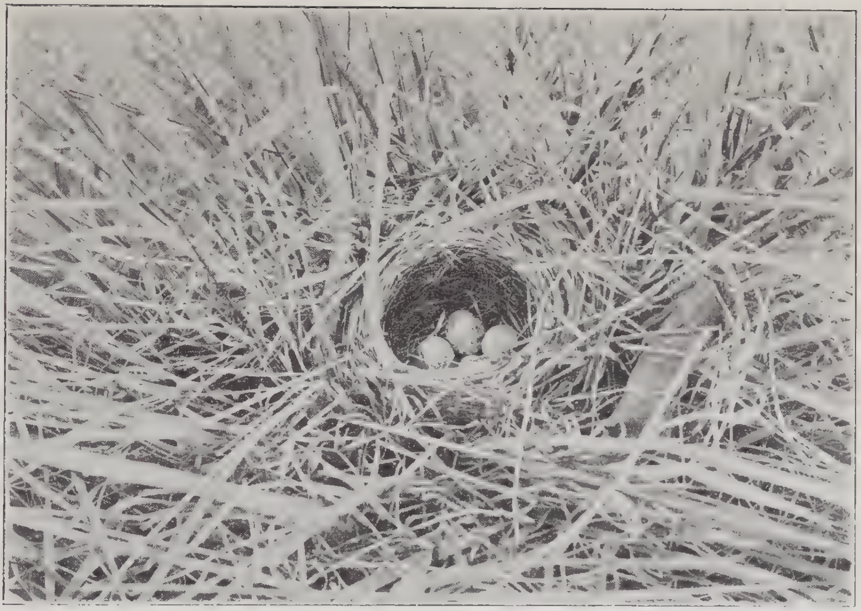

Plate LII. Nest and eggs of Song Sparrow.

From photograph by Thomas L. Hankinson.

236. Lincoln's Sparrow. Melospiza lincolni lincolni (*Aud.*). (583)

Synonyms: Lincoln's Song Sparrow, Lincoln's Finch.—Fringilla lincolni, Aud. 1834.—Passerculus lincolni, Bonap., 1838.—Peucæa lincolni, Aud., 1839.—Melospiza lincolni, Baird, 1858, and most authors.

Very similar to the Song Sparrow, but rather smaller, not so reddish above, no large spot on the breast, but a buffy band across the chest. It is streaked above and below like the Song Sparrow, but the dark streaks are finer, sharper and blacker.

Distribution.—North America at large, breeding chiefly north of the United States and in the higher parts of the Rocky Mountains and Sierra Nevada; south in winter to Panama.

This bird is probably not uncommon in Michigan, although from its resemblance to the Song Sparrow it doubtless is often overlooked. There is no reason why it should not nest within our limits, but so far as we know its nest has not yet been found here. As a spring migrant it arrives from the south much later than the Song Sparrow, probably never earlier than the second week in May, and sometimes not before the end of the month. Considering the rarity of the bird in collections it is rather remarkable that it should be so frequently killed at lighthouses. We have seven records from Spectacle Reef Light, ranging from May 15 to May 23, with one record for September 24 (1889). Mr. N. A. Eddy also reports one killed on the electric light tower at Bay City, May 15, 1890. Mr. Wm. Brewster took one at Oden late in May, 1888, Dr. Gibbs reported it from the neighborhood of Kalamazoo September 28 and October 9, 1879, and Detroit collectors have taken it repeatedly during the first week in October, while migrating. Mr. N. A. Wood reports one taken on Isle Royale, September 1, 1904, and found it common on the Charity Islands, Saginaw Bay, during the fall migration, 1910. He writes: "The Lincoln's Sparrow was seen first September 7 and I noticed two distinct waves of them. September 16 I found this species common on the first sand-dune on the west beach and saw probably more than one hundred. On September 29 I saw numbers also and October 1st still common, but not seen after that date, as all left that night." Among the thousands of small birds killed during migration on the night of Oct. 10-11, 1906, along the eastern shore of Lake Huron, were many Lincoln's Sparrows, Mr. W. E. Saunders finding twelve specimens among the 1845 dead birds counted. (See page 26 of this volume).

It seems to be much more shy than the Song Sparrow and is most often seen skulking along the bushes beside a stream, or from one corner to another of a worm fence in low ground. In its summer home it is said to sing from the top of a bush, in much the same manner as the common Song Sparrow. According to Jonathan Dwight, Jr., in the north it sometimes "surprises the hearer with a most unsparrow-like song. It is not loud, and suggests the bubbling, guttural notes of the House Wren, combined with the sweet rippling music of the Purple Finch, and when you think the song is done there is an unexpected aftermath. The birds sing very little and at long intervals, and are seldom heard during the later hours of the day, ceasing at once if anybody approaches."

The food, so far as it has been examined, is very similar to that of the Song Sparrow. Owing to the scarcity of the bird in this state it is of course of no economic importance.

The nest is said to be placed usually on the ground and to be quite similar to that of the Song Sparrow. According to Chamberlain, the eggs are four or five, pale green or pinkish, sometimes almost white, thickly spotted and blotched with reddish brown and lilac. According to Ridgway they resemble those of the Swamp Sparrow, and average .77 by .57 inches.

TECHNICAL DESCRIPTION.

Second, third and fourth primaries longest and about equal, the first always longer than the sixth.

Adult (sexes alike): Entire upper parts olive-gray to olive-brown, narrowly and sharply streaked with black, most broadly on the middle back and scapulars; top of head with a median stripe of olive-gray; sides of head with essentially the same dark stripes as in the Song Sparrow, but these stripes black rather than brown, and the included light stripes buff or olive (usually the one over the eye olive-gray like the crown stripe, and the maxillary stripe buff); throat, lower breast and belly white, buffy white or grayish-white, the chin and upper throat usually with some narrow black streaks; chest, sides and flanks distinctly buff, sharply and narrowly streaked with black, but without any distinct central dark patch on breast; wings and tail as in the Song Sparrow; bill blackish, only the base of the lower mandible yellowish; iris brown.

Length 5.25 to 6 inches; wing 2.30 to 2.65; tail 2.30 to 3.

237. Swamp Sparrow. Melospiza georgiana (*Lath.*). (584)

Synonyms: Swamp Song Sparrow.—Fringilla georgiana, Latham, 1790, Nutt., 1832.—Melospiza georgiana, Ridgw., 1885, A. O. U. Check-list, 1886.—Fringilla palustris, Wils., 1811, Aud., 1831, and many others.

Plate LI, Lower Figure.

In perfect plumage the crown is rich chestnut, becoming black on the forehead, and much of the back and wings is chestnut, with black streaks. There are no distinct streaks or central dark spot on the breast, which is ashy gray, becoming browner on the sides, the throat and belly white. Often the crown is streaked brown and black with a median ashy stripe, and sometimes there are obscure dusky streaks on breast and sides.

Distribution.—Eastern North America to the Plains, north to the British Provinces, including Newfoundland and Labrador. Breeds from the northern states northward, and winters from Massachusetts southward to the Gulf States.

The Swamp Sparrow appears to be a summer resident in suitable places throughout the entire state, less abundant, however, in the southern parts. It arrives from the south from the middle to the last of April, but numbers continue their northward movement until late in May. We have records of Swamp Sparrows killed on Spectacle Reef Light from April 23 to May 25, and again during the southward migration from September 23 to October 8. About Lansing it is most abundant in migration, during May and October. Although some linger until late in November, it has never been reported from the state in winter.

It always prefers the vicinity of water and is seldom abundant except in places which can be reached only by wading or in a boat. It prefers the more open marshes, avoiding those grown up to willows and trees, although during migrations it may be found almost anywhere in wet places. We have records of its nesting from most of the southern counties, although it does not seem to nest abundantly in many of them. It is a characteristic bird of the wet marshes of St. Clair Flats and vicinity, and is doubtless much more common all over the state than is generally supposed.

The nest, which is much like that of the Song Sparrow, is placed usually in a tuft or tussock of grass rising directly from the water. Possibly it is sometimes placed in a dry situation, but we have never seen one where the water was not at least ankle-deep. The eggs are three to five, similar to those of the Song Sparrow, but usually with greener or bluer ground color, and the markings coarser and scantier. They average .76 by .56 inches.

Descriptions of the song vary much. Hoffmann says "It is simple but musical, as if a Chipping Sparrow were singing in the marshes an unusually sweet song. The call-note is a metallic chink." Bicknell says "In the spring and summer the song is a simple monotone; in the autumn this is often varied and extended with accessory notes. A few preliminary chirps merging into a fine trill introduce the run of notes which constitutes the usual song, which now terminates with a few slower somewhat liquid notes." Seton Thompson says "The commonest song is a simple rapid twet, twet, twet, twet, twet, twet, twet, twet, twet, twet, twet, all in the same note and so rapidly as to be almost a twitter. This is uttered at intervals from some dead branch projecting above the rest of the copse. If not disturbed the singer will sit quietly on this branch for an hour, repeating his ditty once or twice a minute."

In our own experience the song merely suggests that of the Chipping Sparrow, but the notes are less rapid, far sweeter, and have a distinct metallic or bell-like tone which suggests the ring of cut glass. When heard in the dusk of evening it certainly is one of the sweetest sparrow songs which we can recall.

The food appears to consist largely of seeds of sedges, grasses and weeds, varied to a considerable extent with insects; these, however, are probably of little account to the agriculturist owing to the swampy nature of the habitat.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Crown bright chestnut, the forehead clear black and often a few black streaks running back into the chestnut of the crown; most of the rest of upper parts reddish-brown, boldly streaked with black on the middle back and scapulars, and more narrowly on the upper tail-coverts and rump; a more or less perfect collar of ash-gray on the back of neck, sometimes clear but more often streaked with blackish; a conspicuous ash-gray stripe over the eye, beginning at the nostril, bounded below by a black postocular stripe; a blackish line from corner of mouth along under margin of ear-coverts, and a similar line from base of lower mandible along side of throat, these two enclosing a lighter stripe which is gray or buffy according to season; throat and belly whitish or pale gray, the chest and sides darker gray, usually tinged with brown on sides and flanks, but without spots or streaks; outer webs of most of the primaries, secondaries, and middle and greater wing-coverts, bright chestnut; the tertiaries mainly deep black, edged externally with chestnut which whitens toward the tips; bill blackish above, brownish yellow below; iris brown.

In autumn and in immature birds the crown is commonly streaked with chestnut and black, with a more or less conspicuous median stripe of gray, and the chest and sides are distinctly brownish, with some indistinct dusky streaks. Very young birds are similar, but much more distinctly streaked with blackish below, often on throat and belly as well as on breast and sides.

Length 5.25 to 6 inches; wing 2.30 to 2.50; tail 2.40 to 2.70.

238. Fox Sparrow. Passerella iliaca iliaca (*Merrem*). (585)

Synonyms: Fox-colored Sparrow, Fox-tail.—Fringilla iliaca, Merrem, 1786, Nutt., 1832, Aud., 1834.—Fringilla rufa, Wils., 1811.—F. ferruginea, Gmel., 1788, Wilson, 1812. —Passerella iliaca, Bonap., 1838, and most modern authors.

Figures 118, 119.

The large size (over 7 inches), rust-red back, wings and tail, and heavily spotted breast and sides, distinguish this sparrow from all others. But for the short thick bill it might easily be mistaken for a thrush; in fact it strongly suggests the Hermit Thrush.

Distribution.—Eastern North America, west to the Plains and Alaska, and from the Arctic coast south to the Gulf States. Breeds north of the United States, winters chiefly south of the Potomac and Ohio Rivers.

In Michigan the Fox Sparrow seems to be irregularly distributed during migrations, but as a rule is not very common. Near Detroit Mr. Swales says "Not as abundant as it was in the eighties; some seasons pass and I do not see a single bird." Mr. O. B. Warren of Palmer, Marquette county, says "Common, but of rather irregular occurrence; more common in spring than fall. None observed in 1895; they must have suffered from the severe storms in the south, in company with the Bluebird and Hermit and Olive-backed Thrushes."

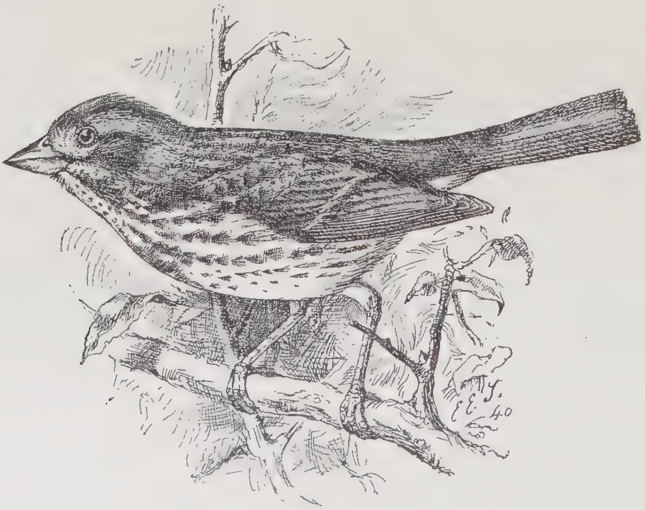

Fig. 118. Fox Sparrow.
From Nuttall's Ornithology. Little, Brown & Co

Ordinarily it arrives from the south in April, early in the southern part, somewhat later than the middle of the month at the north; but apparently it enters the state in March, and we have a record of March 5, 1884 for Saline, Mich., March 21, 1884 at Petersburg, and March 17, 1881 at Battle Creek. Specimens were killed on Spectacle Reef Light April 23, 1890, and October 5 and October 8 the same year. At Bay City Mr. Eddy has noted the species only three times, April 16, 1889, April 18, 1891 and April 19, 1902. At Lansing the bird occurs in small numbers pretty regularly about the middle of April, and is seen again during October and November, Mr. Hankinson recording the last one in 1896 on November 7.

While with us it frequents the borders of woods and fields, as well as the deep woods, but it spends almost all its time on the ground, where it scratches continually among the leaves and rubbish, often making noise enough to be heard at a long distance. Sometimes it appears in flocks of fifty or more but more often in twos and threes, or little squads of about a dozen. Not infrequently it associates with Juncos, Tree Sparrows and other sparrows.

Ordinarily it has only a sharp *chip*, but occasionally it gives snatches of a beautiful song. In its summer home it sings magnificently, and on rare occasions the greater part of its full song may be heard during the last of its stay with us. Mr. C. J. Maynard, describing its habits on the Magdalen Islands in the Gulf of the St. Lawrence, says: "Its magnificent song filled the clear still air with melody. These fine strains consist at first of three clear rather rapid notes, given with increasing emphasis, then a short pause ensues, and the remainder of the lay is poured forth more deliberately, terminating with a well rounded note giving a finish to a sweet song, which for sweetness and clearness of tone is seldom surpassed even by our best performers."

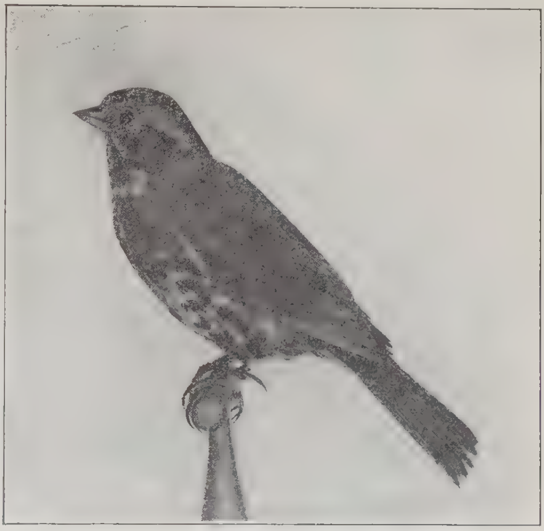

Fig. 119. Fox Sparrow.
Photograph from mounted specimen. (Original.)

There is no nesting record for the United States, but it breeds abundantly in most of British North America from New Brunswick and Manitoba northward. The nest is placed in low bushes, or on the ground, is very bulky, made of grasses, moss, feathers, etc., and the eggs are from three to five, but usually four. These are pale bluish-green to light brown, heavily spotted and blotched with darker brown, and average .91 by .63 inches.

Spending only the colder portion of the year with us, the food of the Fox Sparrow consists of a larger proportion of seeds and a smaller amount of insect matter than in the case of our more familiar sparrows. Doubtless it confers decided benefits on the farmer through the consumption of weed seed, and that it occasionally does valuable work as an insect eater is shown by the fact that a specimen examined by Prof. F. H. King in Wisconsin had eaten 50 chinch-bugs.

TECHNICAL DESCRIPTION.

Adult (sexes alike): Top of head and back of neck brownish-gray or clear dark gray, usually more or less mixed with rusty on the tips of the feathers; back and scapulars similar, but more broadly and heavily streaked with dark reddish-brown or chestnut; upper tail-coverts and upper surface of tail bright reddish-brown or chestnut; a whitish line from nostril to eye, sometimes continued over it to nape; another whitish line from base of lower mandible along lower edge of ear-coverts, separating these (which are reddish-brown) from a red-brown stripe which borders the throat; chin, throat and belly usually white or rusty white and without spots, except sometimes a few small ones on the throat; chest heavily spotted and sides and flanks broadly streaked with bright rufous or chestnut, the spots usually arrow-shaped and often bunched on the middle of the chest, forming a conspicuous spot or patch; usually the lower breast shows a belt of smaller and blackish spots with little or no rufous in them; upper surface of wings and coverts mainly bright rusty or chestnut, the greater and middle coverts often slightly tipped with white or rusty white, forming two more or less perfect wing-bars; basal half of lower mandible yellowish, rest of bill dusky; iris brown. Young: Scarcely different from adults. Length 6.20 to 7.50 inches; wing 3.30 to 3.70; tail 2.80 to 3.15; culmen .43 to .47.

239. Chewink. Pipilo erythropthalmus erythropthalmus (*Linn.*). (587)

Synonyms: Towhee, Ground Robin, Swamp Robin, Towhee Bunting, Jo-ree.—Fringilla erythropthalma, Linn., 1758, Bonap., Nutt., Aud.—Pipilo erythrophthalmus, Jardine, 1832, and most recent authors.

Plate LIII and Figure 120.

Male mainly black above, with white patches in wings and tail; throat and upper breast black, belly white, sides chestnut or rusty-red. Female similar except that the black is entirely replaced by brown. The outer three or four pairs of tail feathers have large white "thumb-marks" which are very conspicuous as the bird flits from bush to bush.

Distribution.—Eastern United States and southern Canada, west to the Plains, breeding from the Lower Mississippi Valley and Georgia northward; in winter from the middle districts southward.

The Chewink is an abundant summer resident over most of the Lower Peninsula, but less common in the northernmost counties. Thus it is far from common about Little Traverse Bay in Emmet county, and S. E. White found a pair one season only on Mackinac Island. On the other hand it seems to be very abundant in Kalkaska, Crawford, and Otsego counties, in the highest parts of the Lower Peninsula. In the Upper Peninsula it seems to be generally distributed but not common, most observers calling it rare, although it has been recorded from nearly all parts except Keweenaw Point and Isle Royale. Mr. T. B. Wyman of Negaunee, Marquette county, calls it "Common everywhere in cutover lands." Boies says it is rare on Neebish Island, but common on the adjacent mainland (Chippewa county).

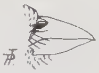
Fig. 120.
Bill of Chewink.

In the southern part of the state a few birds occasionally winter. We have such records from Muskegon (Van Pelt), Ann Arbor (Covert and Wolcott), Plymouth (Purdy), Grand Rapids (February 22, Cole), Genesee county (November 24, Swales), Lansing (E. D. Sanderson, C. J. Davis). Ordinarily it arrives from the south about the end of March, Swales recording it first near Detroit March 16, 1894, while his latest record there is November 3, 1891. At Kalamazoo spring arrivals range from March 9, 1878 to April 12, 1893, while at Lansing it usually appears between March 25 and April 5, and nearly a month later along the Lake Superior shore.

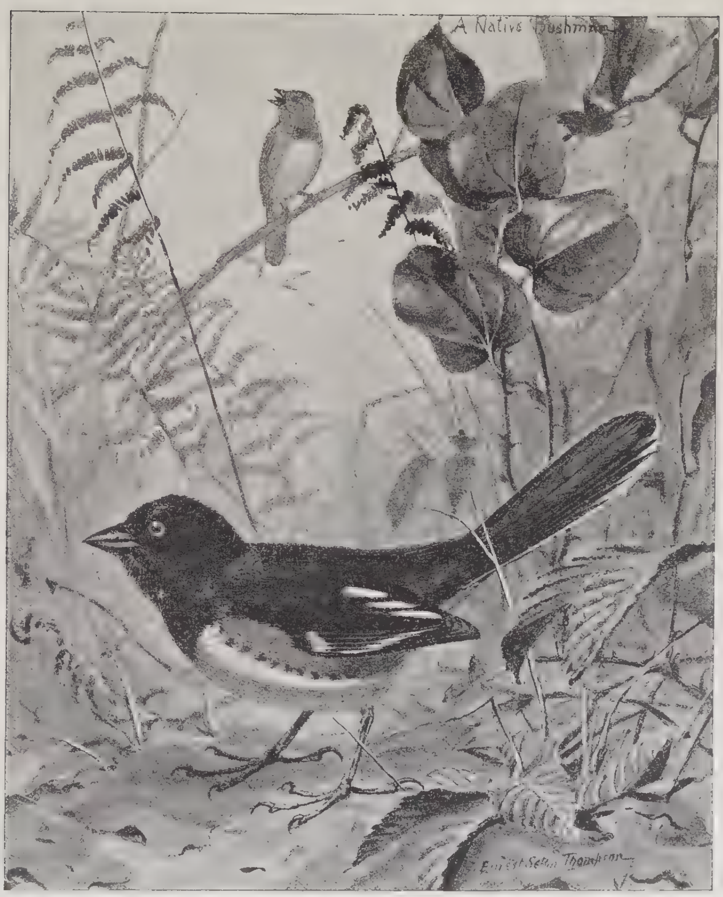

Plate LIII. Chewink. Male.

Reprinted from Chapman's Bird Life. By courtesy of D. Appleton & Co.

The bird is well known everywhere as a constant inhabitant of brush and open woods, being especially abundant along the margins of woodlands adjoining recently cleared areas. It is one of the commonest of roadside birds and one can hardly drive a mile along a country road anywhere in the Lower Peninsula without seeing several. It spends most of its time on the ground, searching for food, where it scratches like a chicken and makes as much noise as a Brown Thrasher or a squirrel.

Its food consists mainly of seeds and insects, though it is fond of wild fruits and eats almost everything, from strawberries and blackberries to wild cherries and grapes. It has never been known to damage cultivated fruits or cause loss of any kind to the farmer. Owing to the nature of its haunts it perhaps is not actively beneficial, though it probably does its share in keeping injurious insects in check.

It nests almost invariably on the ground, building an open but usually well hidden nest, at the foot of a bush or in a brush heap, the nest consisting mainly of fine grasses and fibrous roots and containing four or five eggs, which are white or pinkish, thickly peppered with reddish brown, and average .94 by .71 inches. Possibly one nest in fifty is built in a bush or tangle of vines a foot or two above the ground. Dr. Wolcott records a nest at Grand Rapids placed eight feet from the ground in a broken thorn tree, July 26, 1892, and another at Ann Arbor, June 16, 1894, placed on top of a stump. Two broods are reared almost always, one in June, the other in late July or August, eggs being found late in May and again in July. The nest seems to be a favorite one for the Cowbird, and perhaps no other species is more often chosen for a foster parent. Two, three or even four Cowbird's eggs are frequently found in a Chewink's nest, and occasionally five or six have been found, although in such cases the nest is usually deserted. The eggs of the two species resemble each other somewhat, although the Cowbird's egg is apt to be smaller and to lack the pinkish tint which is usually characteristic of the Chewink's.

It owes the names Chewink, Towhee and Jo-ree to its common two-syllabled call-note, which to our mind is best expressed by the word chewink. Seton Thompson says its common song is like "chuck-burr-pill-a-will-a-will-a; it has also a note like 'twee' (not towhee)." While singing the male usually selects the top of a tall bush or a low tree and often repeats the song a score of times without changing his perch.

TECHNICAL DESCRIPTION.

Adult male: Head, neck, chest, and entire upper parts clear black; lower breast and belly pure white in sharp contrast; sides, flanks and under tail-coverts rusty red or chestnut; wings mainly black, the secondaries unmarked but primaries and tertiaries with white spots and streaks; tail long, slightly rounded, clear black, the outer three or four pairs of feathers with broad, pure white tips; bill black; iris red. Adult female: Precisely like the adult male except that all the black is replaced by plain brown (umber brown); bill dusky above, brown below; iris reddish-brown. Young birds resemble adults in wings and tail, but have the head, back and breast yellowish-brown, streaked with blackish.

Length 7.50 to 8.75 inches; wing 3.30 to 3.75; tail 3.55 to 4.10.

240. Cardinal. Cardinalis cardinalis cardinalis (*Linn.*). (593)

Synonyms: Cardinal Grosbeak, Virginia Cardinal, Kentucky Cardinal, Red-bird, Crested Red-bird. —Loxia cardinalis, Linn., 1758.—Fringilla cardinalis, Bonap., Nutt., Aud.—Cardinalis cardinalis, A. O. U. Check-list, 1886, and most subsequent writers.—Cardinalis virginianus, Baird, 1858, and most authors until 1886.

Mainly brilliant red, a small area about the base of the bill, and running down the throat, black. A high, pointed crest like that of the Blue Jay. Bill red. Female similar, but much duller, even ashy, washed with red, the reddish tint brightest on chest, wings and tail.

Distribution.—Eastern United States, north to the Lower Hudson Valley and the Great Lakes, casually farther north, and west to the Plains.

In Michigan the Cardinal appears to be a rather rare species, mainly confined to the southern half of the Lower Peninsula, and probably most frequently met with in the three lower tiers of counties. Contrary to the usual impression, this bird is resident wherever found, and since it changes its plumage but little with season it is much more conspicuous during winter and so by far the larger number of records are made in winter. There is some evidence to show that it has extended its range northward during the last dozen years. At all events, it had never been recorded from Ingham county until February 1899, since which time it has been found regularly on the campus of the Agricultural College each year, and sometimes four or five individuals have wintered there.

Each spring the birds have remained until well into May and have been quite musical; and two nests have been found. On June 6, 1903, a nest containing two fresh eggs was found on the lower branch of a Norway spruce close to the main road on the south side of the campus. Unfortunately the nest was upset by a student surveying party and although the birds probably nested again we did not locate the family. Another nest was found in June, 1911, which contained only two eggs, one of which did not hatch. In spite of the fact that this nest was in a slender sapling, only five feet from the ground, and in plain view from a path along which hundreds of students passed at all hours, the Cardinals succeeded in getting the single young bird safely on the wing. Undoubtedly the Cardinal nests regularly in the vicinity of the College and is attracted to the campus in winter by the abundance of evergreens, and especially by the numerous tulip trees (*Liriodendron*), on the seeds of which it feeds constantly during cold weather.

Apparently the species is not common anywhere in the state, but a pair or two have been reported from St. Clair county (Swales and Taverner), Jackson county (Mrs. Campbell), Kalamazoo (Dr. Gibbs, W. Wilkowski), Olivet (H. L. Clark), Battle Creek, (N. Y. Green), Petersburg, Monroe county, nesting (Trombley), Hillsdale county (A. H. Boies, T. L. Hankinson), Ann Arbor (Covert, Wood, Cole), Bangor, Van Buren county (F. H. Shuver), Detroit (Swales, Taverner, J. Claire Wood), Grand Rapids (R. H. Wolcott), Forestville, Sanilac county (Albert Hirzel), Beulah, Benzie county (W. M. Wolfe). Reports from the Upper Peninsula probably relate to the Scarlet Tanager, yet the bird is strong of wing, and perfectly hardy at any latitude.

The nest is commonly placed in an evergreen tree or in some thick tangle of vines, and is built of fine twigs, weed stems, grape vine bark, and similar material, making a basket-like structure which is lined with fine roots, tendrils, and sometimes pine needles, but rarely if ever with any soft substances. The eggs are three or four, greenish-white, spotted with brown and lilac, and average .99 by .73 inches.

Much has been written of the Cardinal's song, but although he has a very loud, sweet whistle and a considerable variety of notes, these, so far as our experience goes, are seldom if ever brought near enough together to form what can properly be called a song. The usual call-note, is a clear flute-like whistle of two notes, such as is used in calling a dog, and may be written "wheo-wheo-wheo," sometimes shortened to "cue-cue-cue" and often repeated twenty or thirty times in succession. At other times the call suggests the words beauty, beauty, beauty, with strong accent on the first syllable. Hoffman says: "Its notes are too numerous to transcribe, but are nearly all loud and clear; the same note is generally repeated with energy and rapidly. Some common forms of the song resemble the syllables whoit-whoit-whoit, etc., ku-ku-ku, etc. One form ends in a series of e's so long continued that it apparently ends only when the singer becomes out of breath." The female also is said to sing, but we have heard her utter only the usual call-notes.

The Cardinal is a favorite cage bird and in some sections of the south, particularly about the larger cities, has been nearly exterminated by the systematic removal of the young from the nests. The bird lives readily in a cage and whistles fairly well, but seldom keeps the brilliant plumage for more than a year or two. Nuttall states that an instance is known of one which survived in confinement for twenty-one years.

The Cardinal eats seeds and fruits of various kinds, as well as buds and insects. During the winter he takes berries of red cedar, cat-brier (*Smilax*), bittersweet, the various sumacs, haws (*Crataegus*), and almost any small wild fruit which can be found hanging on tree or vine. His staple food, however, consists of seeds of various kinds, and of these there seem to be no lack. If he has any particular value as an insect destroyer, the fact has escaped observation; we only know that during the nesting season he consumes insects freely and feeds them to his young, and the presumption is that he thus helps to prevent the undue increase of insects which might result disastrously to the agriculturist. In Nebraska Professor Aughey examined the stomachs of four Cardinals killed in August and September and found the stomachs to contain an aggregate of eighty-eight insects, more than half of which were locusts.

TECHNICAL DESCRIPTION.

Adult male: Bill very large, stout, conical, bright red, the feathers all about its base deep black, as are also the chin and upper throat; rest of the plumage deep red, brightest (vermillion) on the under parts, duller or darker on the back, where many of the feathers are tipped with grayish; upper surface of wings and tail similar, the wing-feathers dusky on inner webs; head with a conspicuous, pointed crest, like that of the Blue Jay, but wholly deep red; iris light brown; feet and legs dusky. Adult female: Wings and tail about as in male, and terminal part of crest distinctly red; otherwise quite different; black of face entirely replaced by dull gray; under parts brownish-yellow, and upper parts greenish-gray or brownish-gray; bill and iris about as in male. Young birds are similar to the old female, but duller and with the bill blackish.

Length 7.50 to 9.25 inches; wing 3.55 to 4; tail 3.90 to 4.60; culmen .72 to .82.

241. Rose-breasted Grosbeak. Zamelodia ludoviciana (*Linn.*). (595)

Synonyms: Common Grosbeak, Summer Grosbeak, Potato-bug Bird.—Loxia ludoviciana, Linn., 1766, Wilson, 1810.—Guiraca ludoviciana, Swains.—Coccoborus ludovicianus, Aud.—Hedymeles ludovicianus, Sclater and others.—Goniaphea ludoviciana, Coues, 1873.—Habia ludoviciana, A. O. U. Check-list, 1886.

Plate LIV and Figure 121.

Male, in spring, black, white and rose-color in large masses, the short thick bill nearly white. Female brown or gray, heavily streaked with brown, the wings lined with salmon or yellow, and a distinct whitish line over and behind the eye.

Distribution.—Eastern United States and southern Canada, west to Manitoba and the eastern border of the Plains, breeding from Kansas, and the mountains of the Carolinas northward; south in winter to Cuba, Central America, and northern South America.

This beautiful bird, one of our most brilliant species and a fine singer as well, is generally distributed during summer over the entire state, but apparently in greatest abundance in the Lower Peninsula, although it is reported as not uncommon at Sault Ste. Marie, Marquette, and all the intervening country in the Upper Peninsula, as well as from Keweenaw Point. Mr. Norman A. Wood states also that several were noted on Isle Royale, in northwestern Lake Superior, in September 1904.

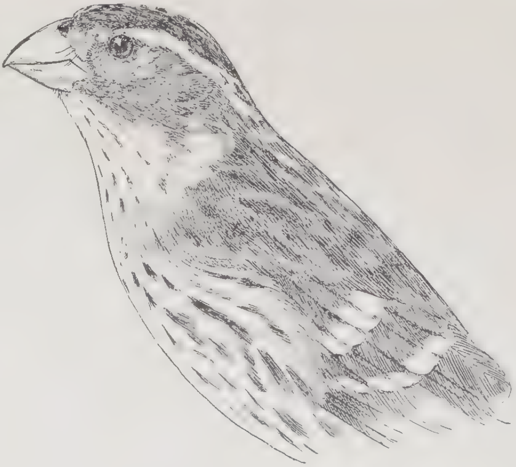

Fig. 121. Rose-breasted Grosbeak. Adult female. From Hoffman's Guide to the Birds of New England and Eastern New York. Houghton, Mifflin & Co.

In the southern part of the state it arrives from the south during the last week in April or the first week in May, and probably reaches the northern sections from the middle to the last of the month. Mr. Swales' earliest record at Detroit is April 30, 1896 and his latest in the fall is October 21, 1893. He thinks the greater number leave for the south between the middle and last of September. Like the Baltimore Oriole and several other common species the Grosbeak becomes very scarce soon after nesting, and during August very few are to be found. It becomes more abundant, however, early in September, after the fall plumage has been acquired.

It seems probable that this species has greatly increased in numbers within the last few decades. This is true not only of Michigan, but of a large part of the eastern United States. The bird does not shun the vicinity of man, but nests almost as frequently in orchards and parks as in the forest. It seems to prefer second growth timber, and especially regions

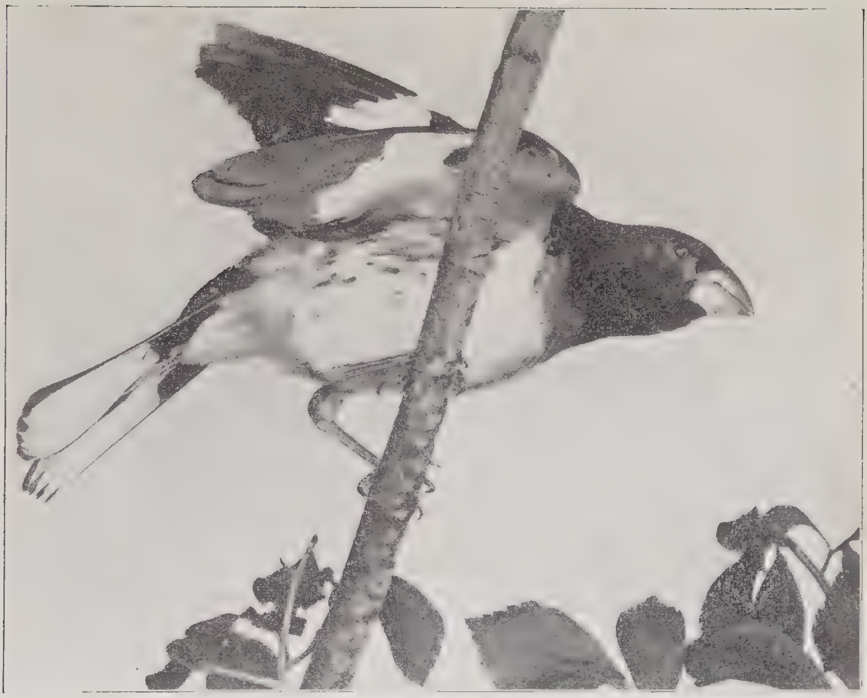

Plate LIV. Rose-breasted Grosbeak. Adult male in spring.
Photograph from mounted specimen. (Original.)

which are somewhat wet and swampy where there is much young growth. The nest, which is usually built late in May, is a somewhat shallow and rather fragile structure, made of the slenderest of twigs, rootlets and other fibrous materials, usually with the bottom so thin and open that the eggs can be seen through it. It is placed ordinarily in a bush or sapling from five to ten feet from the ground, and often so ill-concealed as to be readily seen from a distance. Occasionally nests are built at much greater heights, in one instance at least forty feet up. The eggs are three to five, greenish or bluish, spotted with brown, and average .95 by .67 inches. In the south the bird is said to rear two broods, but we have little evidence that this is the case in Michigan, although nests with eggs are sometimes found as late as mid-July. It is a somewhat remarkable fact, well attested by numerous observers, that the male bird not only incubates, but frequently utters his full song while sitting on the eggs.

The bird is a beautiful singer, its rich sweet warble somewhat resembling that of the Robin, but softer, fuller and much more varied. Usually he remains perched while singing, but occasionally one may be heard warbling as he flies from tree to tree, and two males often burst into full song while chasing each other.

The food is varied, and combines factors favorable and unfavorable to the agriculturist. On first arrival it eats buds very freely and shows a decided preference for the buds and blossoms of fruit trees. One will sit singing for half an hour in a cherry tree, gorging himself with cherry blossoms in the pauses between the songs. Later in the summer he feasts on green peas and helps himself to cherries and strawberries occasionally, but not to excess. On the other hand we have no bird which shows such evident fondness for the potato-bug, and the Rose-breasted Grosbeak has been seen repeatedly carrying potato-bug larvæ to its young, and later escorting the whole family to the field and encouraging them to gather this food for themselves. It also eats other leaf-feeding beetles, and even shows a decided relish for these Chrysomelids which so many birds carefully avoid.

On the whole, considering the bird's beauty, his music, and insect-eating, we have few species which can make stronger claim for universal protection.

TECHNICAL DESCRIPTION.

Adult male in spring: Entire head, neck, and back as far as the rump, deep black; chest, middle line of breast, axillars and under wing-coverts, bright rose-red; rest of under parts pure white, sometimes with a few blackish streaks on sides and flanks; rump pure white (in high plumage sometimes tinted with pink); wings mainly black, with two white wing-bars and a large white bar or patch across the middle of the primaries; tail black, the three or four outer pairs of feathers largely white on inner webs; bill white or pinkish; iris brown. Adult female in spring: Entirely different; upper parts brownish or buffy gray, streaked with blackish, the crown often with a distinct median stripe of gray; a whitish stripe from nostril over eye to nape, bordered below by the brown ear-coverts and a dark stripe behind them; chin and belly whitish; chest and sides more or less buffy, rarely tinged with salmon across the chest, always narrowly spotted or streaked with brown; under wing-coverts lemon yellow to orange; wings and tail grayish brown, the tail with little or no white; the wings with two white bars but with little white on the primaries; bill grayish brown. The adult male in late summer loses all the black body plumage and retains only a fraction of the color on the breast and under wing-coverts, where it is salmon rather than rose. The deep black and pure white of wings and tail are preserved, however, but the general appearance is that of the adult female or young male. The young male in autumn is nearly like the adult male except that the wings and tail are brown like those of the female, and there is always a rosy or salmon wash on the breast and under tail-coverts. A good colored plate showing these plumages will be found in the Auk, Vol. XVI, 1899, facing page 305. Length 7 to 8.50 inches, wing 3.90 to 4.15, tail 3.25 to 3.55.

Note.—For accounts of the Black-headed Grosbeak and the Blue Grosbeak, species of doubtful occurrence in Michigan, see Appendix.

242. Indigo Bird. Passerina cyanea (*Linn.*). (598)

Synonyms: Indigo Bunting, Indigo Painted Bunting, Indigo Finch, Blue Finch, Blue Canary.—Tanagra cyanea, Linn., 1766.—Fringilla cyanea, Wils., Bonap., Aud., Nutt.—Spiza cyanea, Jardine.—Cyanospiza cyanea, Baird, 1858, and most writers until 1886.—Passerina cyanea, A. O. U. Check-list, 1886, and most recent authors.

In full plumage the male appears entirely blue, darkest (almost black) about the head, lightest (cerulean) on the rump; in reality the wings and tail are black or dark brown, edged with blue. The female is brown above, soiled white below, usually with obscure dark streaks on the sides, and the wing and tail-feathers just perceptibly glossed with blue.

Distribution.—Eastern United States, west to Kansas, north to New Brunswick, southern Ontario, and Minnesota; south in winter to Central America.

The Indigo Bird is one of the later migrants to arrive in the state, coming to us at Lansing from the 5th to the 15th of May, a little earlier in the southernmost parts of the state, and perhaps a week later in the Upper Peninsula. It is widely distributed through the state and with the exception of Isle Royale, Lake Superior, from which it seems to be absent, we have yet to hear of a place which it does not visit with some regularity and frequency. It breeds wherever found, and with us almost invariably rears two broods. It is not an early breeder, however, and the earliest nest of which we have record was taken at Kalamazoo, May 30, 1886. Other nests in the same county were June 3, 1876, June 8, 1877 and July 22, 1886, the latter probably a second nest. Dr. Wolcott states that at Charlevoix it nests from June 1 to August 1, but more commonly about July 1. We have records also for Kalamazoo county on August 3 and August 8, and Wood and Frothingham found a pair nesting in Oscoda county August 16.

After nesting is over the bird becomes scarce and shy, and it is difficult to say when they start on their southward migration; we have no record, however, of any taken after September 30th.

The bird is a constant singer from the time it arrives until the second brood is out of the nest, and it sings volubly during the hottest part of the day, usually selecting the top of some tall tree and repeating its song many times before it seeks another perch. In spite of its brilliant color it is not at all conspicuous, and it is surprising how abundant the bird can be without attracting the attention of the average resident.

The nest is usually built among blackberry bushes, hazel thickets, or in similar bushy situations, and is seldom more than three or four feet from the ground. It is bulky and substantial, consisting of grasses and fibrous material of various kinds, but almost always including a considerable number of dead leaves, which often completely cover the outside of the nest. It is lined with rootlets, long hairs, and slender grasses, and usually contains three or four pale bluish-white or pure white eggs, without any spots. Perhaps one nest in a hundred will contain one or two eggs which have small specks of brown on the larger ends. The eggs average .73 by .53 inches.

According to Hoffmann the song "consists often of sets of phrases given in a high key, then repeated in a slightly lower key, growing feebler as the song ends. It resembles the syllables swee-swee-swee, swee-swee (slightly lower), sweet-sweet-sweet, swe-swe (slightly lower), swee, swee, swee." This does not suggest the song satisfactorily to the writer, but it is a difficult song to describe. It is not unlike part of the song of the Goldfinch, which in turn suggests some canary songs, but that of the Indigo Bird has a ringing, rollicking quality which is entirely its own. When heard at a distance it might be mistaken for that of several other songsters, but when close at hand it is not to be confounded with anything else.

The food consists mainly of seeds and berries, but a liberal quantity of insects is added and those often of the most injurious kind. In his study of an orchard infested with canker-worms, Prof. S. A. Forbes, of Champaign, Ill., found that the Indigo Birds were eating the canker-worms more freely than was their usual habit, not less than 78 percent of the food in some stomachs consisting of these span-worms, and only 3 percent of seeds. He also found that they ate freely caterpillars, click-beetles, snout-beetles, chafers, and bugs of various kinds. Since the bird does absolutely no harm to the farmer or horticulturist, and feeds so largely upon injurious insects, it must be regarded as one of our most valuable species and should be carefully protected.

TECHNICAL DESCRIPTION,

Adult male: Entire plumage, except wings and tail, rich deep blue, darkest (ultramarine) on head, neck and breast, lighter (sky-blue or turquoise-blue) on back and sides; wings and tail mainly blackish, but with outer webs so glossed with blue that when folded they show no other color; bill blackish above, lighter below, with a sharp black streak along the keel of the lower mandible; iris brown. Spring males often show whitish patches on the under parts, or buffy feathers scattered here and there, a proof that many individuals do not attain full plumage until more than a year old. Adult female: Upper parts nearly uniform brown, with faint indications of darker streaks, or none; under parts buffy brown, the throat and belly lightest (sometimes almost white), the breast and sides darkest and more or less distinctly streaked with dusky; wings and tail grayish brown, with little trace of light wing-bars, but the tertiaries usually edged with the light brown of the back; primaries and tail-feathers usually faintly glossed with blue on their outer webs. Young birds resemble the adult female, but are somewhat darker, more thickly streaked below, and have no bluish edgings on wing and tail-feathers.

Length 4.75 to 5.75 inches; wing 2.60 to 2.80; tail 2.20 to 2.50.

Note.—For an account of the Varied Bunting or Western Nonpariel, doubtfully accredited to Michigan, see Appendix.

243. Black-throated Bunting. Spiza americana (*Gmel.*). (604)

Synonyms: Dickcissel, Little Meadowlark.—Emberiza americana, Gmelin, 1789, Wils., Nutt., Aud.—Euspiza americana, Bonap., 1838, and most American writers until 1880. —Spiza americana, Ridgw., 1880, A. O. U. Check-list, 1886, and all recent authors.

Male a little larger than an English Sparrow, with white chin, black throat, yellow breast, and chestnut shoulders. The female is smaller and lacks the black throat patch and brown shoulders.

Distribution.—Eastern United States to the Rocky Mountains, breeding from Texas north to Massachusetts, New York, southern Ontario, Wisconsin, Minnesota and North Dakota; south in winter through Central America to northern South America; southwest in migration to Arizona. Now rare or entirely absent east of the Alleghanies.

The Black-throated Bunting is one of our most interesting birds, not alone on account of its beauty, but because it varies greatly in numbers in different localities, and in the same locality in different years. Probably it has always been a resident of the state, yet Dr. Morris Gibbs states that it first appeared in Kalamazoo county in 1873 or 1874 and increased in numbers for ten years or more. He states that it was exceedingly abundant there in 1879, grew noticeably scarcer in the late nineties and was not seen at all in 1903-04. According to A. B. Covert, of Ann Arbor, it reached Washtenaw county in the spring of 1877, while at Petersburg, Mich., Jerome Trombley first mentions it in May 1891. Dr. R. H. Wolcott states that it was never seen at Grand Rapids until June 1899, at one locality, and a few in two or three localities in 1900. Nevertheless, Mr. W. E. Mulliken states that although he never saw the bird himself, Mr. A. B. Durfee found it fairly common in meadows near Grand Rapids previous to 1895. At Plymouth, Mich., James B. Purdy first found it in the spring of 1891, and took two nests, built half way up in tall clover, on June first. He states that they seemed to increase for a few years, but in 1904 were very scarce.

Previous to 1896 the bird seems to have been unknown in Ingham county, but in that year it became fairly common about the Agricultural College and a set of four eggs was taken from a nest in a clover field on the College farm, June 18, 1896, by B. O. Longyear. It continued to be fairly common in that vicinity until 1898, since which time few have been seen. Our northernmost records for the state come from Grand Rapids, and the southern parts of Ionia and Clinton counties. It seems therefore to be confined thus far to the four lower tiers of counties and to be most abundant in the two most southern tiers.

The bird has a similar record in other parts of its range. Many years ago it was abundant in eastern Pennsylvania, and in Maryland and Virginia near the District of Columbia, but it seems to have disappeared completely from these regions. Undoubtedly the species fluctuates remarkably in numbers from year to year, and there are periods when it seems to be fairly abundant over large areas, while a few years later it may be very scarce or entirely wanting in the same localities. No plausible explanation of these variations has ever been given. The bird is far from shy, is conspicuously colored, and has the habit of sitting in the same spot on the top of a bush, tree, fence or telephone pole, and repeating its simple song hundreds of times in succession. Its bright yellow breast and black throat patch make it very conspicuous and it is not likely to be overlooked by bird lovers in any region where it occurs in considerable numbers.

Its song consists of five or six notes which are supposed to sound like the word "dickcissel" with the emphasis on the first syllable. It is not particularly musical, but is perfectly characteristic.

The nest is built of grasses, weed-stalks and leaves, lined with finer grasses and hair, and is placed usually in rank clover or among weeds and coarse grasses within a foot or two of the ground. Occasionally it is built in a rosebush or other small shrub, but always very low. The eggs are commonly four, pale clear blue, without spots, and average .81 by .61 inches.

The food of the Black-throated Bunting has not been carefully investigated, so far as we know, but it undoubtedly eats large quantities of the common insects found in meadows and shrubby pastures, including a liberal supply of grasshoppers. Professor Aughey examined the stomachs of five specimens taken in Nebraska in September 1874 and 1875, and found the food to consist largely of insects, from 20 to 36 in each stomach (most of them locusts), together with many seeds. Professor S. A. Forbes examined eleven specimens taken in an orchard overrun with canker-worms

(Tazewell Co., Ill.), and compared the food with that found in twelve specimens taken here and there in other places. In the latter lot caterpillars formed about 20 percent of the food, while in the former 72 percent consisted of caterpillars, 50 percent being cankerworms, 5 percent other span-worms, 17 percent cutworms, together with 9 percent of beetles, 7 percent of snails, and a few seeds of pigeon grass (*Setaria*). Of course being a typical seed-eater its staple food during a large part of the year consists of the seeds of weeds and grasses.

TECHNICAL DESCRIPTION.

Adult male: Top of head, ear-coverts, and back and sides of neck clear gray or brownish-gray, the forehead and crown often glossed with greenish-yellow; a yellowish stripe over the eye, becoming whitish posteriorly, and another but shorter yellow stripe below the ear-coverts; back brownish-gray, sharply streaked with black; rump and upper tail-coverts similar, but without streaks; chin white; throat black, the color often extending down the middle of the breast; breast (and sometimes belly) yellow in the middle, its sides grayish, as are the sides of the body and the flanks; belly and under tail-coverts white; lesser and middle wing-coverts rufous or chestnut, and the inner scapulars often washed with the same color; wings and tail dusky, edged with brownish-gray; bill dusky above, lighter below, the sides of lower mandible horn-blue at base; iris brown. Adult female: Similar, but duller; usually lacking the black throat, or with simply a row of dark streaks on each side; the light streaks on side of head with little or no trace of yellow, and the yellow of the under parts fainter and less extensive. Young birds are similar to adult females, but are "everywhere tinged with dull buffy or ochraceous" (Ridgway).

Length 5.75 to 6.80 inches, wing 2.80 to 3.30, tail 2.35 to 2.90.

Family 57. TANGARIDÆ. Tanagers.

Of the two species common to the eastern states but one, the Scarlet Tanager, has been found in Michigan thus far. The other, the Summer Tanager, Piranga rubra, is readily separable by its decidedly larger bill, the culmen measuring more than .75 inch, while that of the Scarlet Tanager measures less than .75 inch. (See Appendix.)

244. Scarlet Tanager. Piranga erythromelas *Vieill.* (608)

Synonyms: Common Tanager, Red-bird, Black-winged Red-bird, Summer Red-bird (as distinct from the Winter Red-bird or Cardinal), Fire-bird.—Piranga erythromelas, Vieillot, 1819.—Tanagra rubra, Linn., 1766, Wilson, Nuttall, Audubon.—Pyranga rubra of most authors until 1886.—Piranga erythromelas, A. O. U. Check-list, 1886, and most subsequent authors.

Figure 122.

The scarlet head and body, with black wings and tail, belong to no bird but the male Scarlet Tanager in spring and summer; in autumn the same bird has olive-green or greenish yellow in place of the red, but keeps the black wings and tail. The female is always olive-green above and yellowish below, the wings and tail grayish.

Distribution.—Eastern United States, west to the Plains, and north to southern Ontario and Manitoba. In winter the West Indies, eastern Mexico, Central America and northern South America.

This probably is our most brilliant plumaged bird and a common summer resident throughout the state, but apparently most abundant in the Lower

Fig. 122. Bill of Scarlet Tanager.

Peninsula, although reported from every point in the Upper Peninsula (except Isle Royale) where full observations have been made. It arrives in the southern part of the state late in April or early in May, and from one to three weeks later in the northern parts of the state. It was reported from Petersburg April 23, 1886, April 27, 1888, May 1, 1887 and 1891, May 2, 1892 and 1894, May 5, 1897, and May 6, 1893 and 1898. From Bay City we have one report for April 16, which is the earliest record for the state and is probably a mistake, other records from Bay City ranging from May 2 to May 25.* The arrivals at Lansing fall between April 26, 1902 and May 7, 1901. There is a single record for Sault Ste. Marie, May 21, 1900.

The Tanager is looked upon generally as a rare bird, but to one who is familiar with its robin-like song, and especially with its characteristic call-note, described by Samuels as "chip-churr," the bird is far from rare. During the height of the spring migration a good observer may find from twenty to fifty of these birds in a forenoon's walk, while the writer has occasionally seen several hundreds in the course of a day. In spite of its brilliant color the male is far from conspicuous, and it is no uncommon thing for one to sing for several moments, in full sight and at close range, without being located. Red and green being complementary colors the eye often fails to note the spot of deep red in the midst of the green.

The nest is rather loosely constructed of twigs, rootlets and similar fibrous materials, and is usually placed on the horizontal branch of a forest tree at some little distance from the trunk, but ordinarily less than twenty feet from the ground. Occasionally it is placed close against the trunk, and more rarely still in the upright fork of a small tree. The eggs are three to five, blue green spotted with brown and purple, and average .94 by .65 inches. They are most often found during the first two weeks of June, but we have records from Kalamazoo county, by R. B. Westnedge, from May 29 (1891) to June 21 (1888), and R. H. Wolcott records one nest (presumably at Grand Rapids) as early as May 12. No doubt a second brood is reared occasionally, since young just able to fly are frequently seen late in July or early in August, and occasional males, still in their scarlet plumage, are found singing until the very last of August.

As soon as the young are able to care for themselves the male moults his red plumage and assumes very nearly the dress of the female and in this plumage he moves southward, moulting again during the late winter and early spring, and returning to us in the familiar red and black plumage. At all times the bird appears to prefer oak woods in the neighborhood of swamps, but during migration it may be found in woodlands of any character. Probably the nest is most often placed in oak trees, but one correspondent states that he has always found the nest in pines, another has found it in a hemlock and Dr. Wolcott found it in tamaracks.

The Scarlet Tanager lingers with us well into September, O. B. Warren recording one at Palmer, Marquette county, September 11, 1893, and Mr. Swales' latest record at Detroit being October 2, 1893. Probably as a rule most of them have left the state by the 20th of September.

The song at once suggests that of the Robin, but usually has a certain hoarseness and a nasal character which at once serves to distinguish it. There is much individual variation among the singers and occasionally one is heard which far surpasses the rest. Bicknell states that "contrary to what is true of the Robin and some other birds cool wet weather seems to discourage singing and often on those sultry summer mornings which betoken the hottest days its song in full richness may be heard, though most of the other birds be silenced" (Auk, I, 326).

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*Very possibly this record is based on the Cardinal.

This bird combines the food habits of flycatcher and finch, for it eats immense quantities of insects, many of which are captured on the wing, while it also eats seeds freely and is very fond of wild berries and small fruits, though we have never heard any complaint of injury to cultivated fruit. Most of its food is obtained from the trees, and it is rarely seen on the ground except when getting nesting material. Professor Aughey records the capture of a Scarlet Tanager, in Nebraska in 1874, "which had 37 locusts in its craw and nothing else that I could identify."

TECHNICAL DESCRIPTION.

Cutting edge of upper mandible with a tooth-like projection near middle. Adult male in summer: Entire head and body, above and below, bright blood red, the feathers whitish beneath the surface; wings and tail clear deep black, without light markings of any kind; bill greenish-black; iris brown. Adult female in summer: Upper parts plain olive-green; under parts greenish yellow, brightest on throat and under tail-coverts, duller on breast and sides; wings and tail plain dark gray or dusky, most of the feathers shaded on the exposed edges with olive-green; bill greenish or dusky; iris brown. In autumn the male resembles the female in the body color, but retains the black wings and tail of the breeding season, although many of the wing and tail-feathers are narrowly edged with gray or greenish. The adult female is essentially the same in fall as in summer, and the young in autumn resemble the adult female, but just after leaving the nest they are streaked with dusky on the under parts.

Length 6.50 to 7.50 inches; wing 3.55 to 3.90; tail 2.80 to 3.25; culmen .55 to .60.

Family 58. HIRUNDINIDÆ. Swallows.

Six species occur in Michigan, separable as follows:

KEY TO SPECIES.

A. Large, wing over 5½ inches.—Purple Martin. No. 245.
AA. Smaller, wing less than 5 inches. B, BB.
  B. Tail deeply forked, some of the tail-feathers with large round white spots. Barn Swallow. No. 247.
  BB. Tail slightly forked or nearly emarginate, its feathers without white spots. C, CC.
    C. Forehead cream-white, rump chestnut or rufous. Cliff Swallow. No. 246.
    CC. Forehead not cream-white, rump not rufous. D, DD.
      D. Upper parts metallic blue-green, under parts snow white. Tree Swallow. No. 248.
      DD. Upper parts brownish-gray, not metallic, under parts not all white. E, EE.
        E. Throat and belly pure white, a brownish gray band across the chest, edge of first primary smooth. Bank Swallow, No. 249.
        EE. Throat and breast uniform light brownish gray, only belly and under tail-coverts pure white; edge of first primary rough. Rough-winged Swallow. No. 250.

(Note. The so-called Chimney Swallow is not a swallow but a swift. See page 381.)

245. Purple Martin. Progne subis subis (*Linn.*). (611)

Synonyms: Martin, Black Martin, House Martin.—Hirundo subis, Linn., 1758.—Hirundo purpurea, Wils., Aud., Nutt.—Progne subis, Baird, Allen, Coues, and most authors.

Figure 123.

Largest of our swallows; tail moderately forked. Sexes unlike. Male entirely dark steel-blue except wings and tail which are brownish black without metallic reflections. Female similar above, but duller; under parts grayish or brownish white.

Distribution.—Temperate North America, north to Ontario and the Saskatchewan, south to the higher parts of Mexico, wintering in northern South America.

This species is too well known to need any extended description, being a familiar bird in nearly every city and village of the state, nesting about the cornices of city blocks, in boxes or bird houses especially provided for it, or less commonly in woodpeckers' holes or other cavities in dead trees. It has constant quarrels with the English Sparrow and in many instances is known to have been driven from its quarters by these vandals, although it not infrequently defends its home successfully against them.

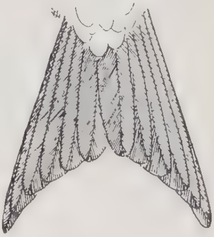

Fig. 123.
Tail of Purple Martin.

In southern Michigan the Martin arrives from the south in April, sometimes as early as the first (Petersburg 1890, Bay City April 2, 1897), more often between the 10th and 20th of the month, but sometimes not until the very last of the month or even the first of May. Careful study of the migration of this species might settle some interesting points as to the migration routes in the state. It was recorded at Palmer, Marquette county, May 28, 1897, and at the Sault May 23, 1899. It is one of the first of our swallows to move southward in autumn, usually disappearing about the middle of August and rarely seen as late as September 1. It thus precedes the Bank Swallow, Barn Swallow and Cliff Swallow by one or two weeks, and the White-bellied Swallow by a month or more.

Ordinarily Martins migrate by day and Prof. Frank Smith observed them in August 1905, at Macatawa Park, Ottawa county, moving southward in immense numbers. He writes "On August 15, 1905 there was a very extensive movement of Purple Martins southward over a strip of territory about one-half mile in width along the shore of Lake Michigan. I counted for three to five minute periods at several different times and found that an average of nearly forty Martins per minute were passing over. I went to Holland, seven miles inland, about 11 a. m. and saw almost no Martins, although watching continuously one and one-half hours (four birds only). They were as abundant as ever on my return to the Lake, 237 passing in five and one-half minutes." There is one record of Martins migrating at night, when they were heard and seen (against the moon) on the night of August 8, at Waterville, Me., and from the fact that first arrivals in spring are as often noted early in the morning as toward night it seems probable that they not infrequently travel at night.

Martins are among our most beneficial birds, their food consisting almost entirely of insects, which usually are captured on the wing, although we have frequently seen them alighting on the tops of elms and other high trees where they were evidently picking small insects from the leaves. In one case (July, 1906), through a field glass it was easily seen that the leaves had been eaten by some larva, either caterpillar or beetle, which the birds evidently were eating, but we were not able to determine the kind. The Martin is often accused of eating honey bees and Wilson states that its food differs markedly from that of other swallows in that it consists largely of wasps, bees and large beetles. Being the largest of our swallows it very naturally eats larger insects than would a Barn Swallow or a Bank Swallow, but we know of no reason to suppose that it eats honey bees or other large hymenoptera. Professor Aughey states that in Nebraska it feeds on locusts at all stages of growth, and more generally than any other swallow.

In its flight it probably excels all our swallows, if not all other species. We do not know that exact measurements of its speed have ever been made, but it often goes several miles from its nest for food and when returning directly it flies with amazing velocity. The Chimney Swift is credited with great speed, but in comparison with the Martin it is ridiculously slow.

It is a common belief among country people that the Martin brings bed-bugs to its nesting places, and that in this way houses and barns become infested. The only foundation for this belief lies in the fact that a peculiar bug, belonging to the same family as the bed-bug, does infest Martins' nests and is doubtless carried from place to place by the birds. This insect, however, is not the bed-bug and cannot live on other animals than swallows. There is therefore no danger whatever of its infesting dwelling houses.

Although this species arrives from the south very early it does not ordinarily nest before the latter part of May or the first of June. Not infrequently the young in the earlier nests perish for lack of food during cold and rainy spells and in such cases second broods are often reared. The young are seen with the parents through July and remain about the nesting places until within a few days of their departure for the south. The nest consists of leaves (often of willow), grasses and similar soft materials, but not infrequently considerable mud is used as a foundation, or in some cases as a barricade about the opening to the nest. The eggs are three to five, pure white, unspotted, and average .97 by .72 inches.

In Butler's Birds of Indiana (1897, p. 991) the statement is made that the Purple Martin "migrates from tropical America both north and south, breeding in the Argentine Republic as naturally as it does with us." This statement we know to be entirely incorrect. Possibly a few of our Purple Martins may cross the equator during the winter, but if so, they do not breed in the southern hemisphere. An allied species, *Progne elegans*, Baird, is found over a considerable part of southern South America, nesting in Argentina and Patagonia and moving northward toward the equator for the winter season, but this bird is distinct from our Purple Martin, although it resembles it somewhat closely. So far as we know it has not yet been proved that any species of American bird which nests in the United States ever passes south of the equator to nest, or even that any species of bird nests both in the north temperate and south temperate zones.

TECHNICAL DESCRIPTION.

Largest of our swallows; wing nearly six inches; tail decidedly forked, the outer feathers half an inch or more longer than the middle ones.

Adult male: Glossy blue-black or steel blue above and below; wings black, with less blue gloss; bill and feet plain black; iris brown. Adult female: Similar, but the glossy blue-black above not so brilliant or continuous; usually a distinct grayish collar on the hind-neck; under parts grayish or grayish white, darker (almost dusky) on throat, chest and sides, lighter on belly and under tail-coverts, where many feathers have narrow dusky shaft-lines; wings brownish-black; bill and feet as in male. The fully adult plumage is not acquired until the second or third year, and many males are found breeding while in a plumage very much like that of the adult female, but usually with scattering patches of blue-black feathers.

Length 7.25 to 8.50 inches; wing 5.65 to 6.20; tail 3 to 3.40.

246. Cliff Swallow. Petrochelidon lunifrons lunifrons (*Say*). (612)

Synonyms: Eave Swallow, Jug Swallow, Barn Swallow, Mud Swallow.—Hirundo lunifrons, Say, 1823.—Hirundo fulva, Bonap., Aud., Nutt.—Petrochelidon lunifrons of most authors.

Recognizable at a glance by the white or cream colored crescent on the forehead (whence the specific name *lunifrons*) and the cinnamon rump, the latter a conspicuous mark when flying. Sexes alike. The tail slightly emarginate, almost square.

Distribution.—North America, north to the limit of trees, breeding south to the valleys of the Potomac and the Ohio, southern Texas, southern Arizona, and California; Central and South America in winter.

This beautiful swallow, although not as well known as the true Barn Swallow, is yet generally distributed throughout the state and nests abundantly wherever suitable conditions obtain. In some cases it is known as the Barn Swallow, being more abundant than the true Barn Swallow, and placing its globe-shaped or flask-shaped nests in a long row under the eaves on the outside of the barn. Formerly the bird is known to have placed its nest on rocky cliffs and in certain parts of the west it still does so commonly, and we have one record of such nesting for Michigan. Max M. Peet thus describes a nesting colony on Isle Royale: "The Cliff Swallow was only found at one place on the island, at Scovill Point, on July 19, 1905, where a number of nests were found placed on the bare face of the rocks. They were above the reach of the waves and were usually protected above by shelving of rock. The nests were composed of mud and lined with feathers but could not be examined closely. Probably they contained young, as the old birds continually flew to the nests and then away again, chattering all the time" (Adams' Rep., Mich. Geol. Surv., 1908, 369). According to Kumlien and Hollister "in 1845 it was nesting abundantly on the cliffs of Devil's Lake [Wis.], and twenty years ago was still breeding there in less numbers, and more about farm houses than on the cliffs. At the present day it has almost entirely deserted the cliffs in Wisconsin, and has gradually spread over all the unsettled parts of the State." In 1877 Professor Aughey counted 2,100 nests of this bird on the sides of a perpendicular chalk rock on the bank of the Missouri river near Niobrara, Nebraska.

About the larger cities and towns in Michigan the English Sparrow has been a potent factor in reducing the numbers of Cliff Swallows. The mud nests of swallows form convenient receptacles for the eggs of Sparrows and they often take possession of the nests and drive the swallows away entirely. In some cases a colony of Cliff Swallows will return year after year to the same nesting place in undiminished numbers, but more often they disappear after a few years and then after an absence of several years may return again. During prolonged rainy spells the mud nests are likely to become loosened from the boards to which they are attached and not infrequently a hundred nests fall to the ground within a few days. After such a catastrophe the owners are very likely to seek a new nesting place. Ordinarily the nest is nearly globular, the entrance being a round hole at or a little below the middle, the nest itself consisting mainly of rounded pellets of mud mixed with very little fibrous material, sometimes with a few straws and grass roots. The typical nest is flask-shaped or retort shaped, the entrance being through a cylindrical or tubular neck, often three or four inches in length. Sometimes these nests are placed side by side and so close as to adhere firmly together, but often little intervals are left and here little platforms of mud are built where the old birds or the young may rest if so disposed.

The food of this species does not differ noticeably from that of the other swallows, although it has not been observed so frequently feeding on bayberries as some of the others. Its usual food consists entirely of insects taken on the wing. These are largely two-winged (dipterous) insects, but immense quantities of beetles and neuropteroid insects are also taken.

The Cliff Swallow arrives from the south at about the same time as the Barn Swallow, that is from the middle of April to the 10th of May, according to latitude, and moves southward again during the latter half of August, the last usually disappearing soon after the first of September. We have records of fresh eggs from Kalamazoo county June 4, 1883 and June 13, 1886, and from Ottawa county May 23 and 24, 1879. The eggs are three to five, white, rather coarsely speckled with brown and lilac, and average .81 by .55 inches. They are not with certainty separable from eggs of the Barn Swallow, but as a rule are more coarsely spotted.

TECHNICAL DESCRIPTION.

Tail with tip emarginate or slightly forked.

Adult (sexes alike): Forehead white or grayish-white; top of head glossy blue-black; middle and lower back glossy blue-black, more or less streaked with pure white; hind-neck with a grayish collar; rump cinnamon or reddish-buff; upper tail-coverts brownish-gray; chin, sides of head and most of throat rich, dark chestnut, often extending around the neck as a narrow collar (in front of the gray one), and spreading more or less over the chest; middle of throat with a patch of blue-black, very variable in extent, sometimes covering most of the throat, sometimes forming only a small spot; breast and sides grayish-brown or reddish-brown; belly white; under tail coverts mottled dusky and white; wings and tail plain dusky or brownish-black; bill and feet black; iris brown. Young: Little or no chestnut about the head and throat, and all the glossy blue-black replaced with dull blackish; throat mixed with dusky and whitish; tertiaries and upper tail-coverts edged with rusty or buff.

Length 5 to 6 inches; wing 4.05 to 4.55; tail 2 to 2.20.

247. Barn Swallow. Hirundo erythrogastra *Bodd.* (613)

Synonyms: American Barn Swallow, Barn-loft Swallow, Fork-tailed Swallow.—Hirundo erythrogaster, Boddært, 1783.—H. erythrogastra, Sclater, 1862.- Chelidon erythrogaster, A. O. U. Check-list, 1886.—Hirundo horreorum, Bart., 1799, Baird, 1858, and many authors.

Plate LV and Figure 124.

Sexes nearly alike. The deeply forked tail (whence the common expression "swallow-tail"), the slender outer feather being about twice as long as the middle one, is characteristic. This is also our only swallow with conspicuous white spots in the tail.

Distribution.—North America in general, breeding from the Fur Countries south into Mexico; visits the West Indies in migration, and winters in Central America and South America.

The Barn Swallow arrives in the latitude of Lansing from about April 20 to May 5, reaching Petersburg, Monroe county, a week or ten days earlier, and points in the Upper Peninsula ten days or two weeks later. Mr. Swales' earliest record near Detroit is April 10, 1899, and his latest April 29, 1900. It was last seen there in the fall on September 29, 1893; this, however, is an unusually late date, most of the Barn Swallows leaving the state before the middle of September.

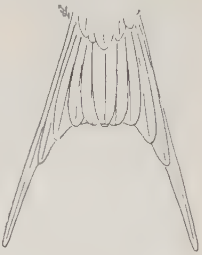

Fig. 124.
Tail of Barn Swallow.

This species on its arrival at once frequents its old nesting places and may be seen gathering insects about the farm buildings and over the neighboring fields with characteristic ease and grace. No bird is better known to the farmer or better loved by the average country dweller. With absolutely no bad habits, believed to subsist entirely upon winged insects, and always graceful, beautiful and musical, the bird has few rivals in the affections of the real nature lover. The twitter of swallows is one of the characteristic sounds of the farm, and nothing can be pleasanter than the sight of a score or more of these graceful birds passing in and out through the gable window of an old barn while feeding their young or their mates sitting on the nests plastered against the rafters within.

The Barn Swallow almost invariably places its nest on the inside of some weather-proof building, and the great majority of nests are placed inside barns. Other buildings, however, are frequently used, especially boat-houses, and in New England the long covered bridges which span some of the streams, and the rows of horse-sheds which stand near every old country church, afford suitable places for the nests. Along the lake shores of Michigan the Barn Swallow frequently nests beneath the piers, placing its nests against the stringers and cross-beams, or between the timbers and flooring, often within a couple of feet of the water. This, however, appears to be a safe place, especially if the space between the timbers and the water is too low to allow small boats to pass through. Mr. Dawson has recorded one instance of Barn Swallows nesting on ledges in a small cave of a cliff, near Lake Chelan, Washington, and Peet cites a similar case at Menagerie Island, near Isle Royale, Lake Superior.

The nest is made of pellets of mud, mixed with a considerable amount of grass or straw, and well lined with fine grass and an abundance of feathers. The eggs are three to five, white, speckled with brown and purplish, the spots usually finer and more numerous than those on the eggs of the Cliff Swallow. They average .77 by .54 inches. First nests are built in the southern part of the state during the second or third week in May, and a week or two later in the northern counties. Two broods are always reared, and according to some observers even a third brood is occasionally attempted.

The food, as already intimated, consists mainly of insects captured on the wing; in fact during the nesting season no other food appears to be taken. During August and September, however, when the swallows gather

Plate LV. Barn Swallow.

From Farmers' Bulletin No. 54.

Biological Survey, U. S. Department of Agriculture.

into immense flocks and prepare for their southward journey, they are very fond of the berries of the wax-berry, bay-berry or wax-myrtle (*Myrica cerifera*), and along the Atlantic coast may be seen by thousands, in company with equal numbers of several other species, alighting on the low bushes and gorging themselves with the nutritious berries. In Michigan this berry is confined to the immediate shores of the great lakes and appears to be abundant only in a few places, so that doubtless most of our swallows pass southward without any of this food. It is not improbable, however, that they occasionally eat other seeds and berries. Like most other swallows this species appears to migrate mainly by day and has the habit of gathering in immense flocks for several days before taking its final departure.

Mr. Bicknell gives the following notes on the song of the Barn Swallow: "An almost universal misconception regards the swallows as a tribe of songless birds. But the Barn Swallow has as true claims to song as many species of long established recognition as song-birds. Its song is a low chattering trill, suggestive of that of the Long-billed Marsh Wren, but often terminating with a clear liquid note with an accent of interrogation, not unlike one of the notes of the Canary. This song is wholly distinct from the quick, double-syllabled note which so constrantly escapes the bird during flight; nor is it, as may be supposed, produced by the commingling of the notes of many individuals in a species highly gregarious. I have heard it repeated many times from single birds, often when they were perched alone on telegraph wires. It is also uttered during flight, and continues into August" (Auk, Vol. I, 325).

TECHNICAL DESCRIPTION.

Tail deeply forked, the outer feathers very narrow toward the tip and 1.50 to 2 inches longer than the middle feathers.

Adult (sexes nearly alike): Forehead deep rusty or chestnut; rest of upper parts, including wing and tail coverts, deep glossy steel-blue; chin and throat rusty brown or chestnut; sides of neck and breast blue-black or plain black, bounding the chestnut neck at the sides and often extending across the breast below it in a collar or breast-band; rest of under parts buffy or pale rusty brown, deeper in the male, paler in the female; wings black; without white markings; tail black or greenish-black, each feather with a large pure white spot on the middle of the inner web; bill black; feet brownish; iris brown. Young: Similar to adults, but much paler below, especially on chin and throat; the chestnut forehead wanting or indistinct; the upper parts dull black, with little gloss; the tail much less deeply forked.

Length 5.75 to 7.75 inches; wing 4.60 to 4.90; tail 3.70 to 4.10.

248. Tree Swallow. Iridoprocne bicolor (*Vieill.*). (614)

Synonyms: White-breasted Swallow, Blue-backed Swallow, White-bellied Swallow, Stump Swallow, Eave Swallow.—Hirundo bicolor, Vieill., 1807.—Tachycineta bicolor, Bonap., Allen, A. O. U. Check-list, 1886.—Iridoprocne bicolor, Coues, 1882.

Figures 125, 126.

Brilliant metallic blue-green above, snow-white below, with dark wings and tail, the latter moderately forked. Sexes alike.

Distribution.—North America at large, breeding from the Fur Countries south to New Jersey, the Ohio Valley, Kansas and Colorado, etc.; wintering from South Carolina and the Gulf States southward to the West Indies and Guatemala.

This probably is our most abundant and uniformily distributed swallow, although perhaps not as well known as the Barn Swallow. It is the earliest of our swallows to arrive from the south and the last to leave in the fall. Not infrequently considerable numbers arrive late in March, and flocks are almost invariably seen in October, often quite late in the month. Mr. Swales recorded a few unusually early birds near Detroit March 27, 1901, and has seen them in the same vicinity as late as October 18, 1890. Mr. L. Whitney Watkins recorded them as still present in flocks at Manchester, Washtenaw county, on October 24, 1904. Ordinarily it appears in the southern tier of counties from the 1st to the 15th of April and reaches the Upper Peninsula before the end of the month. Both in spring and fall it moves commonly in large flocks and especially in the fall these reach an immense size, numbering at least several thousand individuals.

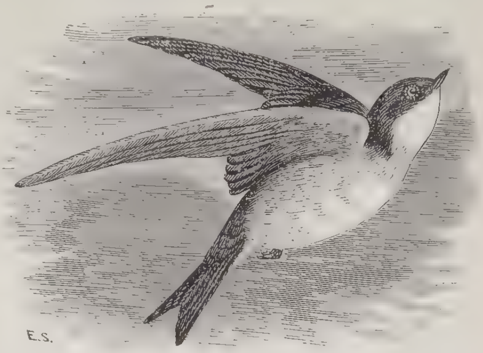

Fig. 125. Tree Swallow.
From Baird, Brewer & Ridgway's North American Birds.
Little, Brown & Co.

The White-bellied Swallow is found all over the state and doubtless nests in favorable places in every county, but rather less plentifully in the southern part of the state. Before the settlement of the country it probably nested altogether in woodpeckers' holes and hollow stumps, and it still uses such places very freely, this fact giving rise to the names Tree Swallow and Stump Swallow. But it also nests freely in boxes prepared for it, and often uses cavities about the eaves and cornices of buildings, which has given the name Eave Swallow in many localities. The nest rarely if ever contains mud in its composition, but is built of grasses, leaves, and similar fibrous materials, and plentifully lined with feathers, and according to several observers a decided preference for white feathers is shown. The eggs are three to six, pure white, unspotted, and average .75 by .52 inches. Two broods are often reared in a season, the first eggs being laid early in May in the southern part of the state, and the second set late in June.

As with other swallows the food consists almost entirely of winged insects and the bird is decidedly beneficial to the farmer. Often on its first arrival in spring it would seem impossible that it could find sufficient insects to keep it alive, but we have seen it repeatedly catching stone-flies (Perlidae) when the mercury was only two or three degrees above freezing, and during these cold spells it is often seen to pick insects from the surface of the snow, or from twigs, fences and sides of buildings. It winters regularly in the south, in immense numbers, and one of its staple foods there is the berries of the wax-myrtle or bayberry (*Myrica*), with which its stomach is often found crammed. In spite of its hardiness it is frequently overtaken by cold waves and heavy storms and sometimes perishes in vast numbers. Such a catastrophe overtook the species in Florida in February 1895, when doubtless hundreds of thousands perished. This will be remembered as the season which destroyed such a large part

Fig. 126.
Head of Tree Swallow.

of the orange groves of Florida and caused the death of myriads of birds belonging to many different species.

According to Bicknell "The song is hardly more than a chatter, and is heard as late in the year as the bird is with us. Its ordinary notes are less sharp and rapid than those of the Barn Swallow."

TECHNICAL DESCRIPTION.

Tail emarginate or slightly forked, the outer feather not half an inch longer than the middle pair.

Adult (sexes alike): Entire upper parts (except wings and tail) deep metallic steel-blue, varying to blue-green; entire under parts pure white, except that the blue of the back sometimes encroaches on the sides of the breast just in front of the bend of the wing; wings and tail clear black, or with faint greenish reflections, without white markings; bill and feet black; iris brown. Adult female usually just like the male, sometimes duller. Adults in late autumn and winter have the tertiaries edged with clear white. Young: Slaty or brownish black above, without metallic gloss; under parts often grayish white.

Length 5 to 6.25 inches; wing 4.50 to 4.80; tail 2.30 to 2.50.

249. Bank Swallow. Riparia riparia (*Linn.*). (616)

Synonyms: Sand Swallow, Sand Martin, Bank Martin.—Hirundo riparia, Linn., 1758, Wils., Nutt., Aud.—Cotyle riparia, Bonap., 1838.—Cotile riparia, Boie, 1822, and many subsequent writers.—Clivicola riparia, Stejn., 1882, A. O. U. Check-list, 1886.—Riparia riparia, Jordan, 1884.

Figure 127.

Smallest of our swallows; sexes alike. Brownish gray above, without any metallic luster; below pure white, except for a brownish-gray band across the chest and often a central spot of the same color just back of this band. Tail slightly emarginate—hardly forked. (Fig. 127).

Distribution.—Northern Hemisphere; in America, south to the West Indies, Central America, northern South America; breeding from the middle districts of the United States northward to about the limit of trees.

This well known little swallow is abundant throughout the state and is constantly to be seen about its nesting places in sand banks from the time of its arrival late in April until its departure in September. Apparently it rears but one brood each summer, but it is subject to many troubles and undoubtedly many pairs are compelled to make several attempts before they succeed in rearing a family, so that occupied burrows may be found frequently as late as the middle of July, although young are on the wing by the first of that month. While this species seems to have a preference for the borders of streams, lakes and other bodies of water, yet it often selects for a nesting place a railroad cut or sand pit a long distance from any water, but in such cases it runs the risk in dry seasons of being unable to supply its young with a sufficient amount of food.

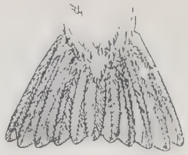

Fig. 127.
Tail of Bank Swallow.

Its nests are placed in burrows in sand banks, these burrows being usually at some distance from the foot of the bank, often only one or two feet from the top. They may be straight, elbowed to right or left, or curved, but the entrance is usually lower than the inner end, and although the eggs are sometimes laid on the bare sand, there is oftener a more or less elaborate nest of grasses, leaves and feathers. The eggs are three to six, pure white, unspotted, and average .70 by .49 inches. Occasionally the bird selects a bank of gravel or clay, and one or two instances have been recorded in which it has nested in banks of sawdust.* On June 6, 1902 the writer saw from the train large numbers of Bank Swallows about sawdust piles at Otsego Lake, Otsego county, Mich., and as there were numerous holes in the vertical sides of these sawdust heaps it seems probable that they were nesting there, but it was impracticable to stop and investigate. Mr. E. S. Rolfe found them nesting abundantly in North Dakota in the walls of an abandoned dry well about fifteen feet deep. He states that the perpendicular clay walls were honeycombed with the nesting holes (Nidiologist, III, 96).

The food does not differ appreciably from that of the preceding species with which it often associates.

The Bank Swallow is of particular interest from the fact that it is common to both the Old and the New World, our common bird being identical with the Sand Martin of Great Britain, Scandinavia and northern Asia, and in the latter places it nests almost or quite to the Arctic circle.

Dr. Gibbs and one or two other observers state that in their experience the Bank Swallow's nesting burrows are not cylindrical, the openings being more or less flattened ovals instead of true circles, while in the Rough-winged Swallow the holes are said to be invariably circular. We have not been able to verify this statement, in fact we have seen burrows of both species which were perfectly cylindrical, although we have also seen many of the Bank Swallows' which have oval entrances.

TECHNICAL DESCRIPTION.

Tail emarginate or slightly forked, the outer feather about one-fourth inch longer than the middle pair.

Adult (sexes alike): Upper parts nearly uniform brownish-gray, a little darker on top of head; a brownish gray band across the chest, and extending along the sides somewhat; rest of under parts pure white; wings and tail blackish, without white markings, the tertiaries brownish-gray like the back; bill and feet dusky; iris brown. Young: Similar, but the wing and tail coverts and most of the secondaries and tertiaries with buffy or whitish edgings.

Length 4.75 to 5.50; wing 3.70 to 4.25; tail 2.10 to 2.25.

250. Rough-winged Swallow. Stelgidopteryx serripennis (*Aud.*). (617)

Synonyms: Bridge Swallow.—Hirundo serripennis, Audubon, 1838.—Cotyle serripennis, Cassin, Sclater, and others.—Stelgidopteryx serripennis of most authors.

With the adult bird in hand one need only stroke the outer edge of the wing to feel the rough barbs of the first primary, which gives the bird its name. In size and color it closely resembles the Bank Swallow, but is uniform brownish-gray on throat and breast, only becoming white on the belly and under tail-coverts. There is thus no brownish chest band.

Distribution. United States at large, north to Connecticut, southern Ontario, southern Montana and British Columbia, and south through Mexico and Costa Rica. Breeds throughout its United States range and south into Mexico.

In Michigan the Rough-winged Swallow appears to be less common than any other species. That it is really more abundant than it seems is highly probable, yet the fact remains that it has been noted at very few points outside the southern fourth of the state. It arrives from the south at about the same time as the Bank Swallow, possibly a little later, and departs in autumn somewhat earlier, probably between the middle and last of August.

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* Franconia, N. H., Auk, XX, p. 436.

Its close resemblance to the Bank Swallow has doubtless prevented its recognition in many places, yet in spite of everything we cannot suppose that it is abundant anywhere. Mr. Swales stated in 1904 that he knew of but one breeding resort in southeastern Michigan, where a few pairs occupied a sand bluff in connection with Bank Swallows. During the past few years, however, both Swales and Taverner have found this species fairly common in different places in Wayne and Monroe counties. Mr. Taverner wrote in 1908: "I have found the Rough-winged Swallow surprisingly common lately. I suppose that heretofore it has been overlooked, but now that I can pick it out I am finding it in several places." Dr. Wolcott found it breeding in small numbers in crevices in a brick block, in Grand Rapids, by the river. We have one specimen in the college collection which was taken in Barry county, and we have a set of five eggs taken at Kalamazoo June 9, 1888. Two pairs were found buildings nests in the bank of the Red Cedar river on the College campus, Ingham county, May 7, 1905, but they were disturbed by the dumping of rubbish over the bank and abandoned the place. Swallows had nested regularly in this bank for several years previously, but no specimens were taken and they may have been Bank Swallows. Mr. S. E. White found a single specimen dead, in July 1890, at Mackinac Island, and this appears to be the northernmost record for the state.

In Wisconsin it appears to be abundant, since it is stated to be the common breeding bank swallow which is found scattered over most of the state. "It is usually found nesting in single pairs, or not more than two to four pairs in a single bank; whereas the bank Swallow nests in large colonies."* Aside from the color differences given above several points are useful in discriminating between the two species. The Rough-wings often nest in crevices in masonry, for example, in holes in a brick wall or in the chinks of a bridge pier, and when they nest in a sand bank or clay bank rarely more than three or four nests are found in the same bank. Sometimes a few pairs nest with a large colony of Bank Swallows, and in this case their burrows, according to Butler,† are likely to be placed singly and a little apart from the others. The Rough-wings are also said to build much better nests than the Bank Swallows and their flight is slower and more even, with fewer twists and zigzags, and more gliding and sailing.

The eggs are three to six, pure white, unspotted and average .72 by .51 inches.

TECHNICAL DESCRIPTION.

Tail emarginate or slightly forked, the outer feather not more than one-fourth inch longer than the middle pair; adult always with outer edge of outer primary roughened by the recurved and hooked tips of the barbs.

Adult (sexes alike): Upper parts uniform grayish brown; wings and tail a darker shade of the same, sometimes nearly blackish toward the tips of the feathers; tertiaries often edged with lighter gray; chin, throat, breast and sides light brownish-gray; belly and under tail-coverts white; bill and feet blackish; iris brown. Young: Similar to adult, but whole plumage more or less washed with brownish, the tertiaries and secondaries tipped and edged with pale reddish-brown or cinnamon.

Length 5 to 5.75 inches; wing 4 to 4.70; tail 2.05 to 2.35.

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*Kumlien & Hollister, Birds of Wisconsin, p. 106.

† Birds of Indiana, 1897, p. 999.

Family 59. BOMBYCILLIDÆ. Waxwings.

Birds of this family may be recognized at a glance by the prevailing olive plumage, the strongly crested head, and the dark tail, every feather of which is tipped with bright yellow.

We have but two species, readily separated as follows:

A. Larger, wing over four inches with a conspicuous white bar; under tail-coverts rich chestnut. Bohemian Waxwing. No. 251.

AA. Smaller, wing less than four inches and without any white; under tail-coverts white or yellowish. Cedar-bird. No. 252.

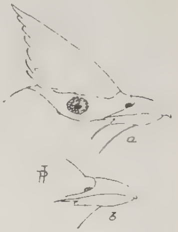

Fig. 129. Head and bill of Cedarbirds.

251. Bohemian Waxwing. Bombycilla garrula (*Linn.*). (618)

Synonyms: Northern Waxwing, Big Waxwing, Bohemian Chatterer.—Lanius garrulus, Linn., 1758.—Ampelis garrulus Linn., 1766, and most authors.—Bombycilla garrula, Vieill., 1817, Bonap., Aud., Nuttall.

Resembles a very large Cedar-bird, but in addition to most of the peculiarities of those birds the Bohemian Waxwing has always two or more conspicuous white patches on the wings and often also bright yellow tips on some wing-feathers.

Distribution.—Northern parts of the Northern Hemisphere. In North America south in winter irregularly to Pennsylvania, Illinois, Kansas, southern Colorado and northern California. Breeds north of the United States.

The Bohemian Waxwing is an irregular winter visitor in Michigan, coming from the far north in flocks of varying size and most often appearing in the latter part of the winter. So far as we can learn it has never been abundant, but small flocks have been recorded here and there at considerable intervals, and single specimens are found in local collections in various parts of the state. No doubt the common Cedar-bird is often mistaken for this species, the impression being quite general among careless observers that the Cedar-bird is not found in Michigan in winter and that any waxwing seen must be the Bohemian.

We have a specimen in the College collection taken on the College campus previous to 1894, but the exact date not obtainable. Very likely it was taken in the winter of 1879-80, when this species appeared in some numbers in most of the northern states, including New York, Michigan, Illinois and Indiana. In Illinois a specimen was taken by Prof. S. A. Forbes (Dec. 18, 1879) at Villa Ridge, Pulaski county, in about latitude 37 degrees, the most southern record for the United States. Mr. Hazelwood includes it in his Port Huron list (manuscript, 1904), but calls it very rare. Major A. H. Boies found it on Neebish Island, in the St. Mary's River, and we have a specimen taken there by him, November 15, 1896. Covert records the capture of two males and a female at Ann Arbor on December 12, 1869. Judge Steere states that it occurs occasionally at Sault Ste. Marie in winter, the last date given being 1885. It occurs in most of the older lists and possibly was more abundant formerly than at present, yet this is not demonstrated.

Twelve birds were seen, with a large flock of Cedar-birds, at Greenville, Montcalm county, January 16, 1899, by Percy Selous, and a single specimen was taken from this flock later by Mr. Selous and preserved in his collection. During the winter of 1908-1909, it was reported from several localities in the Great Lakes region, in company with other northern species, notably the Evening Grosbeak and Pine Gorsbeak. Mr. E. E. Brewster, of Iron Mountain wrote us March 5, 1909, that he had seen one flock of sixteen and heard of numbers being seen in the city. During the same winter specimens were taken on Point Pelee, Ontario, about twenty miles east of Detroit (Taverner).

According to Kumlien & Hollister it was formerly much more common in Wisconsin than at present, and of much more regular occurrence in the northern part of the state than in the southern counties. G. F. Dippie states that several flocks appeared in Toronto, Canada in February 1895, and were seen nearly every day until March 10. They frequented the streets in the very heart of the city in order to feed on berries of the Mountain Ash. "Just nine years since they were taken here last" (Nidiologist, II, p. 112).

This species nests mainly in the far north, but is said to breed as far south as the United States border in the Rocky Mountains (Coues). The nest and eggs are described as very similar to those of the common Cedar-bird except that the eggs are decidedly larger, averaging about 1.00 by .67 inches (Coues). For a recent account of nest and eggs taken near Fort Smith on the Slave River, near 60° north, see Auk, XXVI, 1909, p. 10.

During its winter visits this bird feeds mainly on the same berries, seeds and fruits as the Cedar-bird, being partial to the berries of the juniper, haw, dogwood, mountain-ash, sumacs, etc.

TECHNICAL DESCRIPTION.

Top of head with a long pointed crest; wings conspicuously marked with white; tail tipped with bright yellow.

Adult (sexes alike): Forehead, lores, and streak over and behind the eye, velvet black; frontal part of crown bright reddish-brown or chestnut, the color usually extending along the sides of the crown and sometimes tinting the whole top of head and sides of neck; rest of upper parts grayish brown to gray, the neck usually brownest, the color changing on the back to brownish-gray and becoming clear ash-gray on rump and upper-tail coverts; chin deep velvet black, shading through dusky and dark gray on throat to brownish-gray on chest and pure ash gray on breast, sides and belly; a white stripe at base of lower mandible, changing to brown on cheeks; under tail-coverts rich chestnut, in strong contrast with the ash of belly; wings slate-colored or black, the primary coverts with white tips, and a conspicuous white bar across the tips of the secondaries; the inner primaries also spotted with white or yellow, or both, on the tips of the outer webs; secondaries often with bright red, sealing-wax-like appendages at the tips of the shafts; tail ash-gray at base, shading into deep black toward the end, and broadly tipped with bright yellow; bill and feet black; iris brown. Young: Much duller than adult; streaked below with brownish or dusky and white; no wax-like tips on wing, but always recognizable by the crest, the yellow-tipped tail and the size.

Length 7.40 to 8.75 inches; wing 4.40 to 4.60; tail 2.75 to 2.90.

252. Cedar-bird. Bombycilla cedrorum *Vieill.* (619)

Synonyms: Cedar Waxwing, Carolina Waxwing, Common Waxwing, Cherry-bird. —Ampelis cedrorum of most authors.—Ampelis americana, Wils., 1808.—Bombycilla carolinensis, Steph., 1817.

Figures 128, 129.

The pointed crest and yellow-tipped tail, with the olive wings which show no white, are characteristic of this bird at all ages and seasons. Adults may or may not have red "sealing-wax" tips on the inner wing-feathers.

Distribution.—North America at large, from the Fur Countries southward. In winter from the northern border of the United States south to the West Indies and Costa Rica. Breeds from Virginia, the southern Alleghanies, Kentucky, Kansas, etc. northward.

The well known Cedar-bird or Cherry-bird is abundantly distributed over the entire state, being most abundant in summer, but a few remaining through the winter. Even at Marquette, on the south shore of Lake Superior, it frequently winters and in some numbers. Apparently the severity of the winter has little to do with its residence, but it is more frequently seen during January and February than during December. Undoubtedly the great bulk of the species moves southward entirely out of the state in the late fall and returns again in earliest spring, frequently in the latter part of February and always before the end of March. At this time it is oftenest seen in flocks of twenty to fifty individuals, although bands of several hundred are by no means uncommon. A little later, in April and early May, it often becomes quite scarce, but reappears in large numbers during June when the small fruits begin to ripen. At this time it is still in flocks, although some of the birds may be already nesting and it seldom visits the cherry trees singly or in pairs, but usually in companies of ten to thirty.

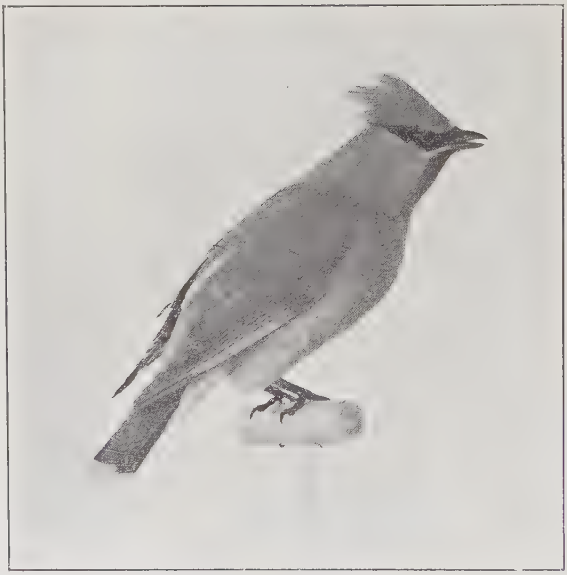

Fig. 128. Cedar-bird.
From photograph of mounted specimen.
(Original.)

It is erratic in its nesting, the greater part of the birds apparently nesting in June and many of them again early in August, while nests are occasionally found late in August or even in September. Dr. Gibbs states that nests found at Kalamazoo June 12 and 15, 1877 with four eggs each are about as early as any he has known; his collection, however, included one set of eggs taken in Kalamazoo county May 3, 1877, in an orchard tree twelve feet from the ground. Mr. Swales, of Grosse Isle, is of the opinion that certain individual birds may prefer orchards for nesting and that these breed during June, while others, which prefer uncultivated regions, nest much later, even into September. According to his notes the Cedar-birds arrive in the vicinity of Detroit from March 11 (1890) to April 8 (1895), and leave for the south about the middle of October.

Apparently they do not nest so abundantly in the southern part of the state as farther north, and about the cedar and tamarack swamps in the northern part of the state they are one of the most abundant and characteristic birds during late summer. Here they may be seen in small flocks perched on the dead branches of isolated trees, from which they make continual sallies for passing insects, of which the bulk of their food seems to consist. They, however, eat large quantities of wild fruits, being particularly fond of raspberries, blueberries, service-berries (*Amelanchier*) and Buffalo berries (*Shepherdia canadensis*). They also relish all kinds of wild cherries, even eating the choke-cherry freely. The attacks on cultivated cherries are too well known to need extended mention, yet it should be noted that the bird prefers the earliest cherries and even when most abundant and destructive is not nearly so serious an enemy as the common Robin. It also eats cultivated currants, raspberries, blackberries and mulberries, but not, in our experience, to any injurious extent.

On the other hand, we have no bird which is more valuable to the horticulturist as an insect eater, for it not only eats insects freely and at all seasons when they are obtainable, but it seems to be partial to many of the forms which are specially injurious to the farmer and fruit grower. Thus it eats caterpillars of many kinds, and, as Prof. Forbes and others have shown, it sometimes almost confines itself to a diet of canker-worms when these are unusually abundant. In one orchard which Prof. Forbes studied carefully a flock of about thirty apparently took up their residence and fed freely on canker-worms. The number in each stomach, determined by actual count, ranged from 70 to 101, and was usually about 100. These thirty birds were therefore eating the pests at the rate of at least 3,000 a day, or 90,000 in the month during which the caterpillar is exposed to their attacks.* Study of the stomach contents of 152 Cedar-birds by the Ornithological Division of the U. S. Department of Agriculture, showed that 74 percent of the food consisted of wild fruits, 13 percent of cultivated fruits (only 5 percent being cherries), and the remainder of insects, largely grasshoppers, bugs, bark-lice and beetles, the elm-leaf beetle appearing as an important item.†

During spring and early summer the Cedar-bird appears to be very fond of blossoms, and especially of the stamens, of many trees, particularly fruit trees. We have seen it frequently eating the stamens of apple, pear, cherry, oak, maple and ash, and it doubtless eats stamens of many other varieties, but there is no reason to suppose that any damage whatever is done in this way.

This is one of the birds which for fifty years has suffered continually from the demand for its plumage by milliners, and even today Cedar-birds are common "hat birds" wherever legislation does not prevent their use. Their convenient size, beautiful plumage and gregarious habits, permitting many to be killed at a single shot, all favor their use in this way, but thanks to the growing public sentiment against this barbarity, and especially to the persistent and energetic work of the Audubon societies, the evil is now nearly stamped out.

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*Report Mich. State Hort. Soc., 1881, p. 204.

†F. E. L. Beal, Farmers' Bull. No. 54, p. 32.

Although the Cedar-bird has nothing which can be called a song it is far from a silent bird. It has a peculiar, penetrating, sibilant lisp which can be heard several hundred yards and is often uttered rapidly and in unison just before the flock takes flight. While feeding on cherries, or while moving from place to place, individuals continually utter this lisping cry, but neither so loudly nor continuously.

During the winter time the birds feed very largely on juniper berries or cedar-berries (whence the name Cedar-bird), as well as on the berries of the mountain ash, haw, sumac, bittersweet, choke-berry, black alder (*Ilex verticillata*), smilax, and particularly on the sugar-berry or hack-berry (*Celtis*). Undoubtedly the Cedar-bird is one of nature's most active agents in the distribution of the seeds of many of these beautiful shrubs and trees.

The nest is composed largely of grasses, weed-stalks, leaves, roots and similar fibrous materials, often in great variety, and is frequently quite bulky. It is placed at heights varying from six to forty feet, in trees of various kinds, most often in orchard trees or in evergreens, the red cedar itself being a favorite nesting tree. The eggs are peculiarly colored and marked, being bluish or purplish white, spotted and dotted rather sharply with dark brown, purplish and black. This is one of the few species whose eggs can be identified usually at a glance. They average .87 by .61 inches.

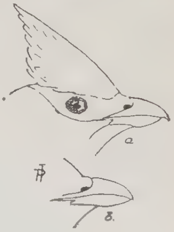

Fig. 129.
Bill of Cedar-bird.

TECHNICAL DESCRIPTION.

Top of head with a long, pointed crest; wings with or without red, wax-like tips, but always without white markings; tail tipped with bright yellow.

Adult (sexes alike): Forehead, lores, and stripe behind eye, velvet black, usually bordered above with a narrow white line; top of head (including crest), back and scapulars, an indescribable soft olive-brown or olive-gray, sometimes with a distinct rufous tinge on cheeks and sides of neck, and shading imperceptibly into clear ash-gray on rump and upper tail-coverts; a narrow white line backward from base of lower mandible, and a white spot on lower eye-lid; chin deep black, shading through dusky-olive on the throat into clear olive or olive-gray on breast and sides, and this into olive-yellow or even clear yellow on flanks and belly; under tail-coverts pure white or buffy white; wings ash-gray or slate gray, blackening toward the tips; the secondaries always without white markings but often with red, sealing-wax-like tips; tail square or a little emarginate, ash-gray at base, shading into deep black near the end and abruptly tipped with bright yellow. In very high plumage a row of red wax-like tips is occasionally found on the tail, but these are never as large as those on the wings. Their presence on the latter seems to be independent of sex or season, but is merely a question of age—or perhaps of strength and vigor. Young birds lack them altogether, but many breeding individuals are also without them. Young: Similar to adult in the crest and the yellow-tipped tail, but colors much duller and the under parts streaked with dusky or brownish and white.

Length 6.70 to 7.50 inches; wing 3.60 to 3.90; tail 2.30 to 2.60.

Family 60. LANIIDÆ. Shrikes or Butcherbirds.

Birds of about the size and general appearance of a Mockingbird, but with the strongly hooked bill of a hawk. Our species are separable as follows:

KEY TO SPECIES.

A. Larger, wing over 4.25 inches. Northern Shrike. No. 253.
AA. Smaller, wing 4 inches or less. Migrant Shrike. No. 254.

(Note.—The Loggerhead Shrike and the White-rumped Shrike are so similar to the Migrant Shrike as to be separable only by experts. Both have been reported in Michigan, but thus far no unquestionable specimen has been taken. See Appendix.)

253. Northern Shrike. Lanius borealis *Vieill.* (621)

Synonyms: Great Northern Shrike, Winter Shrike, Butcher Bird, Winter Butcher Bird.—Lanius excubitor, Forst., 1771.—Lanius borealis, Vieill., 1807, and many other writers.—Collyrio borealis, Baird, 1858.—Collurio borealis, Baird, 1866, B. B. & R., Coues, Ridgw. and others.

A bird about the size of a Robin, with bill notched and hooked like a falcon's, must be a shrike and will have clear gray or brownish-gray upper parts, ashy or white under parts, wings and tail mainly black with large white patches, and a conspicuous black bar or stripe on the side of the head. If the wings measure 4¼ inches or more it will be the Northern Shrike or Butcher Bird; if the wing is but 4 inches or less it will be the Loggerhead or one of its varieties. In the Northern Shrike the breast and belly are ashy, usually marked with fine, dark, wavy cross-lines.

Distribution.—Northern North America, south in winter to the middle portions of the United States. Breeds north of the United States.

This bird is a not uncommon, but rather irregular, winter visitor from the north, arriving sometimes as early as October, more often not until November, and lingering until March. While with us it is most likely to be seen in the neighborhood of towns and villages in pursuit of English Sparrows, or engaged in tearing out the brains of one which it has just caught and the body of which it will immediately afterward hang up on a sharp twig, the thorn of a haw, or the point of a barbed-wire fence. Occasionally when driving we see it perched on the telephone wire, and while watching for its prey it commonly selects the top of a bare tree, or at least some conspicuous point which overlooks the neighborhood. It flies with an undulating motion, somewhat like a woodpecker, generally gliding downward from its perch and crossing a field quite close to the earth, rising suddenly to the top of a bush or tree on which it perches.

It feeds largely on meadow-mice and small birds, often following a flock of Tree Sparrows or Juncos and killing many more than it needs for food. Of late years it has been quite serviceable in destroying English Sparrows, and in the parks of many large cities it has been carefully protected on this account. The habit of impaling its prey upon a sharp point is common to all members of the family and has never received a satisfactory explanation. Undoubtedly the Shrike returns sometimes and eats some of the food thus stored, but this is by no means its invariable custom. When its prey is abundant it usually contents itself with eating the brain and perhaps a part of the head, impaling the rest. If food is very scarce, or perhaps for some other reason, it not infrequently attacks larger birds, and the writer has seen it making vigorous efforts to capture Blue Jays and Pine Grosbeaks, and there are many records of its flying against windows in the effort to get a Canary Bird hanging just inside.

The Northern Shrike is very commonly confounded with the Loggerhead and its varieties which, however, are not found in Michigan during the winter, although the species may overlap each other a little in spring and fall. In spite of the numerous "records" there is no reason whatever to believe that the Northern Shrike has ever nested within our limits; on the contrary it nests always in the far north and is seldom or never seen within our boundaries between the first of May and the first of October. Its nest is quite similar to that of the other shrikes, being very large for the size of the bird, made of twigs (usually thorny), weed-stalks, grasses, wool, hair, feathers, etc., and placed usually in a low, thick, thorny bush where it is comparatively safe. It is deeply hollowed and the eggs are four to seven, soiled white, spotted with brown, and average 1.05 by .76 inches.

The ordinary call of the Northern Shrike is a rather harsh scream or shriek, but, as observed repeatedly by competent observers, it has a veritable though decidedly peculiar song on occasions. Bicknell describes one of these songs as follows: "The song was a medley of varied and rather disconnected articulation, an occasional low warble always being quickly extinguished by harsh notes, even as the bird's gentle demeanor would soon be interrupted by some deed of cruelty. It has been claimed that the Butcher Bird attracts birds and small animals by imitating their cries, thus making them its easy prey. It is true that notes similar to the screaming of small birds and the squealing of mice are interspersed through its song, but they are uttered without method and sometimes actually in conjunction with the most harsh and startling sounds of which the bird is capable" (Auk, Vol. I, 324-325).

TECHNICAL DESCRIPTION.

Adult in winter (sexes alike): Upper parts clear ash-gray, bleached to white or whitish on outer edges of scapulars, on upper tail-coverts, and along upper edge of the loral and post-ocular black stripe; a white spot on the lower eye-lid; a broad streak under and behind the eye deep black, as are also part of the nasal bristles, but the bristly feathers in the middle, at the base of the culmen, are usually white or whitish, and the lores mixed black and gray; under parts light grayish, or almost white on throat and belly, the breast and sides thickly marked with fine wavy cross-lines of dusky; wings mainly black, most of the primaries pure white at base, and most of the secondaries and tertiaries tipped with whitish; middle tail-feathers entirely black, or with very narrow white tips, the remainder of the tail-feathers broadly white-tipped; upper mandible blackish, the lower dusky at tip but yellowish at base; feet black; iris brown. In summer the lores are said to be clear black, and this is sometimes the case with winter specimens.

Young of the year (and in first winter): Similar to adults, but lores gray; upper and under parts strongly washed with brownish; wings, tail and post-ocular stripe brownish dusky or dull black; greater wing coverts usually edged and tipped with rusty or buff; the under parts strongly and extensively cross-lined with brownish, only the chin and belly unmarked.

Length 9.25 to 10.75 inches; wing 4.35 to 4.60; tail 4.50 to 4.70; culmen .70 to .80.

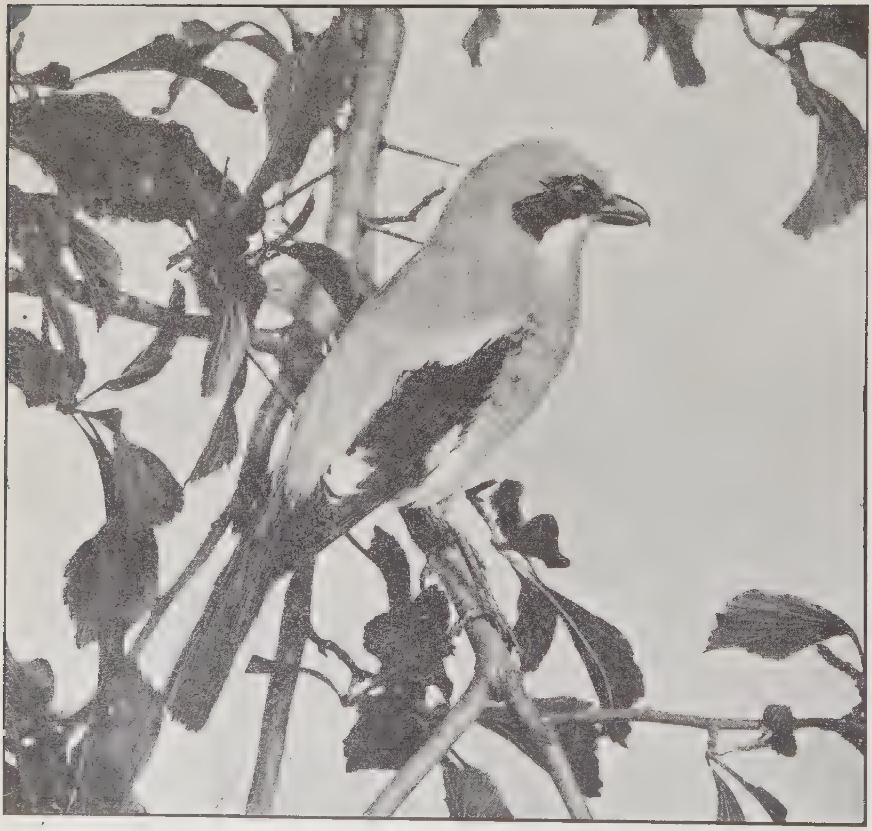

Plate LVI. Migrant Shrike.

From photograph of mounted specimen.

(Original.)

254. Migrant Shrike. Lanius ludovicianus migrans *W. Palmer.* (622c)

Synonyms: White-rumped Shrike (in part), Loggerhead Shrike (part), Butcher-bird, Summer Butcher-bird.—Lanius lud. migrans, Palmer, 1898.—Lanius excubitroides, Peabody, 1839.—L. excubitoroides, Hoy, 1853.—Lanius ludovicianus, Woodh., 1853, and most authors from 1875 to 1898.—Collurio ludovicianus, Allen, Ridgw., Merriam, and others.

Plate LVI and Figures 130, 131.

Known by its close resemblance to the Northern Shrike, but smaller (wing 4 inches or less); under parts grayish-white to pale bluish-ash, usually without any wavy cross lines. The wings are slightly longer than the tail.

Distribution.—Eastern Canada and eastern United States, west to Minnesota, south to the Carolinas, Tennessee and lower Mississippi Valley. Breeds chiefly in the northern parts of its range, migrating south in winter.

Reports from observers would indicate that the Migrant Shrike arrives in Michigan from the south between the middle of March and the middle of April and retires southward again during October. Although nowhere abundant it is widely distributed throughout the state and probably occurs regularly in every county. It is a typical roadside bird, and along country roads, where clumps of hawthorn (*Cratægus*) abound, it is sure to be seen at intervals perched on the telephone wire or some tall bush or tree, or winging its leisurely, looping flight across the adjoining fields. Its plumage always suggests that of the Mockingbird, but its habits and general appearance are widely different.

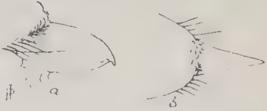

Fig. 130.
Bill of Migrant Shrike.

It nests early, often before the middle of April, building its bulky nest usually in the interior of a thick thorn bush, where it can be reached by the average small boy only with the utmost difficulty. Being generally considered a "Butcher Bird" and destructive of other birds, it is held to be legitimate prey and is often shot on sight and its nest destroyed whenever opportunity offers. This may account for the fact that although it rears two broods, often with six or seven eggs in each nest, it nevertheless remains a somewhat scarce bird.

As a matter of fact the Migrant Shrike is probably one of our decidedly beneficial birds. It feeds very largely—almost entirely—on insects, varying its diet occasionally with field mice or meadow-mice, and still more rarely with a sparrow, not infrequently an English Sparrow. The insects which it devours probably are not all injurious, yet many of them belong to the more injurious groups. Its habit of impaling its surplus food on the thorns in the vicinity of its nest allows us to judge somewhat of the character of this food. Most often we find large beetles, such as May-beetles, goldsmith-beetles and stag-beetles, together with large grasshoppers, the Carolina locust, and an occasional cicada. Sometimes it catches a small snake, a frog or a lizard, but the greater part of its food certainly consists of insects. The late Dr. Judd of the U. S. Department of Agriculture, Washington, D. C., found by stomach examinations that about 24 per cent of the food of the Loggerhead (and its varieties) consists of mice and birds, and the remainder of insects, mostly grasshoppers, although caterpillars are eaten to some extent (Biol. Survey, Bull. 9, 1898, 15-26).

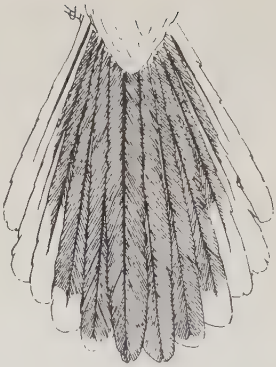

Fig. 131.
Tail of Migrant Shrike.

At Greenville, Montcalm county, the late Percy Selous recorded a nest with eggs April 23, 1894, the young becoming full-fledged on May 25, while the same pair (presumably) brought out a second brood on July 26. Dr. Gibbs records fresh eggs from Kalamazoo county April 18, 1878, April 27 and 30, 1879, and others were obtained on May 18, 1880, and June 22, 1878. The late Richard B. Westnedge, of Kalamazoo, took six eggs from a nest May 26, 1888, and six from another nest June 5, 1892. In that part of the state the nests seem to be placed as often in osage orange hedges and neglected orchard trees as in thorn trees. The eggs vary in number from five to eight, but are ordinarily six or seven, and are hardly separable, except by size, from those of the Northern Shrike already described. The average given by Ridgway for the typical Loggerhead, the southern form, is .97 by .73 inches, but specimens of *migrans* in the college collection average nearly 1.00 by .75 inches.

TECHNICAL DESCRIPTION.

Bill strongly hooked, wing less than four inches, tail shorter than wing, third and fourth primaries about equal, the third usually a little longest.

Adult (sexes essentially alike): Upper parts ash-gray to blue-gray, usually paler (sometimes whitish) on rump and upper tail-coverts; forehead commonly paler than the crown; under parts mainly pale ash-gray, deeper (almost the shade of the back) on chest and sides; throat and belly nearly or quite white; markings of head, wings and tail, and colors of bill, feet and iris, precisely as in the Loggerhead; the young also are similar to those of that species.

Length 8 to 10 inches; wing of male 3.75 to 3.99, of female 3.80 to 3.88; tail of male 3.60 to 3.90, of female 3.60 to 3.78; culmen about .53 (Wm. Palmer).

Family 61. VIREONIDÆ. Vireos or Greenlets.

A small family of interesting and valuable birds, represented in Michigan by half a dozen species which are so similar in size, color, voice and habits as to be readily confused by the beginner. The following key will help to separate them:

KEY TO SPECIES.

A. With a spurious (i. e. small, almost rudimentary) first primary. B, BB.
  B. White wing-bars conspicuous, sides and flanks bright yellow. C, CC.
    C. Lores white and a white ring around the eye. Blue-headed Vireo. No. 259.
    CC. Lores and eye-ring yellow (iris white). White-eyed Vireo. No. 260.
  BB. White wing-bars indistinct or lacking, sides and flanks nearly white or barely yellowish. Warbling Vireo. No. 257.

AA. Without a spurious first primary. D, DD.
  D. Two white wing-bars, throat bright yellow. Yellow-throated Vireo. No. 258.
  DD. No white wing-bars. E, EE.
    E. Throat pure white, wing over three inches. Red-eyed Vireo. No. 255.
    EE. Throat pale yellow, wing less than three inches. Philadelphia Vireo. No. 256.

255. Red-eyed Vireo. Vireosylva olivacea (*Linn.*). (624)

Synonyms: Red-eyed Greenlet, Little Hang-nest, Preacher.—Muscicapa olivacea, Linn., 1766, Wilson, 1810, Bonap., 1824.—Vireo olivaceus, Nutt., Aud., A. O. U. Check-list, 1886, and most authors.

Plate LVII and Figures 132, 133.

In living or freshly killed birds the red iris is distinctive. Other points are the absence of wing-bars, lack of spurious first primary, large size, and pure white under parts.

Distribution.—Eastern North America, west to Colorado, Utah and British Columbia; north to the Arctic regions; south in winter from Florida to northern South America. Breeds nearly throughout its North American range.

All things considered this is probably our most abundant vireo and it is found as a summer visitor everywhere throughout the state, being much more abundant, however, in some sections than others. In the southern part of the state it arrives from the south about the first of May (Detroit April 28 to May 7, Swales); in the northern part from two to three weeks later; and departs in early September. In the southern part of the state it lingers late in the fall, most individuals tarrying until after the middle of September and occasionally well into October. Mr. Swales noted one near Detroit October 16, 1899. This is one of the birds which often meets death at the lighthouses along the lakes and there are fourteen records of such disasters at Spectacle Reef, in Lake Huron, the autumn dates ranging from September 10, 1895 to October 7, 1893.

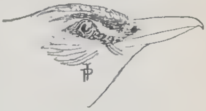

Fig. 132.
Red-eyed Vireo.

It nests everywhere in the state and the neat cup-shaped swinging nest is a familiar object on the bare trees and bushes of midwinter and has given the bird the common name of "Little Hangnest." It seems probable that at least two broods are reared in a season, since in the Lower Peninsula fresh eggs may be found from about May 20 until late in June, while occasional nests are found all through July and sometimes in August. Peet found a pair feeding nearly full grown young July 14, 1905, on Isle Royale.

The nest is placed usually within a few feet of the ground, often within arm's reach, but occasionally twenty or twenty-five feet up. It is always pensile, usually hung in the lateral fork of a small twig, and commonly in plain sight. It is built of various flexible materials, largely strips of bark, fibres from weed stems or various grasses, and is lined with finer plant fibres and fine leaves and grasses, often with pine needles. The exterior is often decorated with egg cocoons of spiders, bits of caterpillars' silk, pieces of birch bark, and even fragments of paper and other conspicuous materials. The eggs are three to five, most often four, and are pure white, sparsely spotted with brown and black. They average .81 by .56 inches. Very frequently Cowbirds' eggs are found in the nest and the Vireo frequently deserts its nest on account of this intruder.

Wilson Flagg speaks of this bird as the "Preacher" and describes his song as follows: "His style of preaching is not declamation. Though constantly talking, he takes the part of a deliberative orator who explains his subject in a few words and then makes a pause for his hearers to reflect upon it. We might suppose him to be repeating moderately, with a pause between each sentence 'you see it—you know it—do you hear me?—do you believe it?' All these strains are delivered with a rising inflection at the close and with a pause as if waiting for an answer." Bicknell calls him "a most untiring vocalist, maintaining his song almost uninterruptedly through the summer and only relinquishing it in September from the first to the tenth."

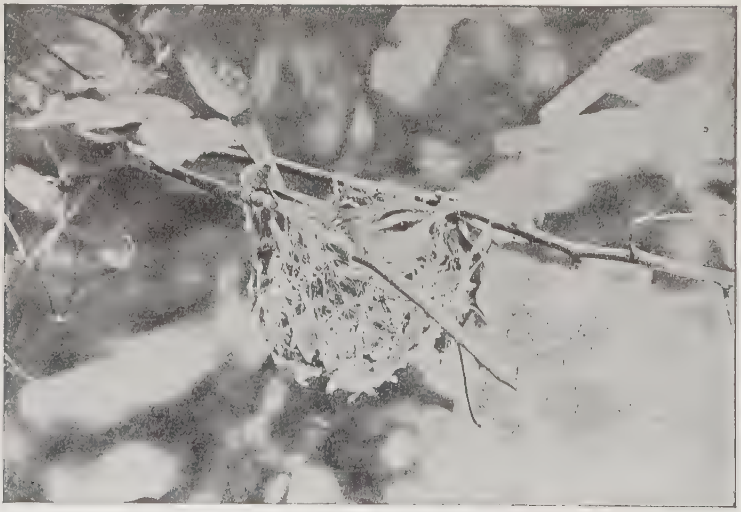

Fig. 133. Red-eyed Vireo on nest.

From Bird Lore. Courtesy of Frank M. Chapman.

According to Ridgway "It is probable that we have no more beneficial bird than this species, noxious and destructive insects of numerous kinds constituting its principal food" (Birds of Illinois, p. 182). All the vireos are similar in their feeding habits and spend most of their time gleaning insects from the foliage of shrubs and trees. Probably they consume more spanworms and leaf-rollers than any other group of birds, but they are not slow to avail themselves of any unusual supply of insects and they eat beetles, bugs, and even grasshoppers apparently with equal readiness and impartiality. Professor Aughey of Nebraska found that during years of invasion by the Rocky Mountain locust the Red-eyed Vireo ate the young hoppers very freely, four-fifths of its food at one time consisting of this species.

During the late summer and autumn the Red-eye eats seeds and berries

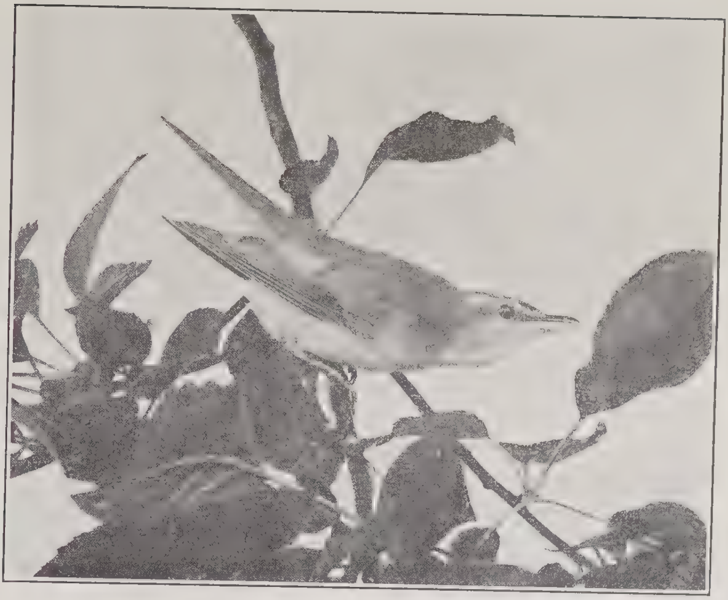

Plate LVII. Red-eyed Vireo.

From photograph of mounted specimen.

(Original.)

of various kinds, being particularly fond of the berries of the spice bush or benzoin and of sassafras. It also eats raspberries, blackberries, wild cherries, viburnum, and a great variety of other fruits, but these usually in small quantities, and so far as we know, never of cultivated varieties. The bird may be said to have absolutely no bad habits and to confer marked and continuous benefits on the horticulturist and farmer.

TECHNICAL DESCRIPTION.

Bill slightly hooked at tip; rictal bristles evident; no spurious first primary; no wing-bars.

Adult (sexes alike): Top of head ashy-gray; rest of upper parts olive-green, this color edging all the wing and tail-feathers and coverts; a whitish stripe from nostril over eye, bordered above by a more or less distinct narrow dark line; lores dark gray or dusky and this color sometimes continued as a more or less distinct stripe behind the eye; ear-coverts and sides of head buffy-gray, changing to grayish-olive on sides of neck and along sides of breast and body; rest of under parts pure white, usually washed with buffy on under tail-coverts; wings and tail plain dusky, without bars or spots; bill brownish above, yellowish below; iris red.

Length 5.50 to 6.50 inches; wing 3.10 to 3.30; tail 3.15 to 3.30; culmen .50 to .55.

256. Philadelphia Vireo. Vireosylva philadelphica *Cassin.* (626)

Synonyms: Philadelphia Greenlet, Brotherly-love Vireo.—Vireosylvia philadelphica, Cassin, 1851.—Vireo philadelphicus, Baird, 1858, A. O. U. Check-list, 1886, and most authors.

The decidedly smaller size and distinct yellowish tinge below serve perfectly to separate this bird from the Red-eyed Vireo, which it resembles in the lack of wing bars and the absence of a spurious first primary. The iris, however, is brown, not red.

Distribution.—Eastern North America, north to Hudson Bay; south in winter to Costa Rica and Panama. Breeds from Maine, New Hampshire and Manitoba northward.

This is one of our rarest vireos, though probably more numerous than our observations would seem to show. It occurs mainly if not entirely as a migrant, but our records are too few to enable us to do more than indicate the approximate time of its arrival and departure. We have records of about twenty-five specimens taken in various parts of the state, the majority in the fall. Mr. Trombley records one at Petersburg, May 4, 1897, and two specimens were taken at the Agricultural College on May 9, the same year. Mr. Eddy took a male on the 17th of May, 1897, in Bay county, and S. E. White took two specimens at Grand Rapids, Mich., on May 15 and 24, 1890. A specimen was killed on Spectacle Reef Light, May 25, 1892. Our earliest record in the fall is from Mackinac Island August 6, 1899, when S. E. White secured a specimen. He obtained another on August 7, 1890, and saw two more on September 6 of the same year. Mr. Swales took a specimen at St. Clair August 28, 1896, and J. Claire Wood took specimens in Wayne county, September 3, 10 and 24, 1905. Specimens were also taken by T. L. Hankinson at Hillsdale May 13, 1896, and in Ingham county September 14, 1895. Dr. Gibbs records a specimen taken at Kalamazoo May 23, 1882, and another taken in Ottawa county in May 1879, by W. A. Gunn. This last specimen, identified by Ridgway, is probably the first record for the state. One was taken at Ann Arbor May 30, 1907 (Wood), and one near Detroit September 27, 1908 (Taverner); it was recorded also from Isle Royale, Lake Superior September 1, 1904 and September 12, 1905 (Peet).

The Philadelphia Vireo is not certainly known to nest within our limits, but it is not improbable that it may do so in the northern part of the state. In general appearance, voice and nesting habits it is so very similar to the Red-eyed Vireo that it might be easily overlooked even by the expert. Mr. William Brewster, who took a nest and three eggs near Umbagog Lakes, Maine, June 14, 1903, describes the nest as placed in an aspen (*Populus tremuloides*) thirty feet or more from the ground; perfectly pensile and ornamented like the nests of the other vireos, especially those of the White-eye and Solitary. The song of the bird he considers almost identical with that of the Red-eye.

Jonathan Dwight, Jr., describes the song as heard at Tadousac, Quebec, as follows: "To my ear the song partakes of the liquid sweetness and leisurely irregularity of that of the Solitary Vireo, the notes being sweeter, clearer, and a trifle higher pitched than those of the Red-eye. * * * As the song of the Red-eyed Vireo is well known to many of us, some idea of that of the Philadelphia Vireo may be gained when I say that while the former rapidly ripples out his music, the latter reiterates slowly a series of double or triple notes with marked pauses between. My experience has been that if one has heard *philadelphicus* he will seldom mistake it for *olivaceus*, while the reverse will not hold" (Auk, XIV, 1897, 266-267).

The eggs are almost precisely like those of the Red-eyed Vireo, but average slightly smaller, the measurements given by Brewster being .79 by .54, .81 by .53 and .80 by .54 inches.

The food probably does not differ much from that of the other vireos. We have found it eating plant-lice in the fall, and Aughey found it eating locusts in large numbers in Nebraska, one stomach containing twenty-one locusts and another nineteen.

TECHNICAL DESCRIPTION.

Bill slightly hooked at tip; rictal bristles evident; no spurious first primary; no wing-bars.

Adult (sexes alike): Top of head dull ashy-gray; rest of upper parts similar, but the back decidedly tinged with olive-green like that of the red-eye; a whitish stripe from nostril over the eye, but no dark line above this stripe; usually a dusky spot in front of eye; sides of head and neck more or less buffy; under parts distinct pale yellowish, usually with a greenish tinge, and the color pretty uniform, perhaps faintest on the belly; wings and tail plain dark grayish, the outer edges of all feathers and coverts washed with olive-green, but no bars or spots; bill brownish gray, yellowish below; iris brown.

Length about 4.80 inches; wing 2.50 to 2.75; tail 1.90 to 2.20; culmen .38 to .40.

257. Warbling Vireo. Vireosylva gilva gilva (*Vieill.*). (627)

Synonyms: Warbling Greenlet.—Muscicapa gilva, Vieill., 1807.—Sylvia gilva, Vieill., 1817.—Vireo gilvus, Bonap., 1824, Nutt., Aud., Coues, A. O. U. Check-list, 1886, and most recent authors.

About the same size as the preceding (much smaller than the Red-eye), but with the under parts merely tinged with brownish yellow or creamy buff, never pale sulphur yellow. The first primary is spurious, the wing-bars very indistinct or entirely wanting, and the iris plain brown.

Distribution.—North America in general from the Fur Countries to Oaxaca, Mexico. Breeds throughout the greater part of its range.

This is an abundant bird throughout most of the state, in some places being more plentiful than the Red-eye, while the reverse is true in other sections. It appears to be most abundant in the Lower Peninsula, but this may be due in part to the fact that it is partial to the well shaded streets of towns and villages, and so is more frequently met with. It has been reported from practically all the counties of the state, and doubtless may be found in all. It arrives from the south the last of April or first of May, the earliest date at Petersburg being April 21, 1889, and the latest May 5, 1893. At Battle Creek the first was seen April 19, 1889, at Bay City May 7, 1890, and Sault Ste. Marie May 6, 1900. Near Detroit Mr. Swales says it arrives from April 27 to May 7 and is usually gone southward by September 15, his latest fall record being September 28, 1889.

In its nesting habits it closely resembles the Red-eyed Vireo, but its song is unlike that of any other. It is a sprightly and musical warble which resembles closely that of the Purple Finch, although it is weaker and shorter. Dr. Brewer says "One of the sweetest and most constant of our singers. Its voice is not powerful, but its melody is flute-like and tender." To one familiar with the songs of the other vireos the song of the present species would suggest an entirely different bird, certainly one of the Fringillidæ.

Its food probably resembles that of its relatives very closely but it doubtless has certain likes and dislikes. It eats a few seeds and berries, but is mainly an insect eater and one of the farmer's best friends. In Nebraska Prof. Aughey found it eating the young of the Rocky Mountain locust in all stages of their growth and saw it bring them constantly to its nest as food for the young. Prof. Forbes in his study of the birds of an orchard overrun with canker-worms, found that 35 percent of the food of the two Warbling Vireos taken one season consisted of canker-worms, while other caterpillars made 43 percent additional, and other insects, mainly injurious, formed almost all the remainder. Three other specimens contained 44 percent of canker-worms, 35 percent of other caterpillars, and 15 percent of beetles.

Apparently the nest is quite variable in structure and location. On the average it is more slightly built, and in higher situations, than the nest of the Red-eye. Shade trees are favorite nesting places and it is frequently seen in elms, maples, and other common shade trees along the streets and in city parks. Ordinarily it is perfectly pensile like that of all the other Vireos, yet Dr. Wolcott (MS. list, December, 1904), states that the nest in his experience is frequently swung between three or four vertical twigs or even placed in a crotch. He also has found it to be thicker walled, firmer and better lined. Numerous observers state that the nest is frequently found in orchards and there can be no doubt that the bird is partial to such situations.

Eggs are most likely to be found in central Michigan during the last week in May and the first week in June, but a pair was seen building near the Agricultural College, May 15, 1903, and doubtless the birds often rear a second brood in late June or July. The eggs are scarcely separable from those of the other vireos, being white, thinly spotted with brown and black, and averaging .75 by .55 inches.

According to Dr. Gibbs this is one of the few species which sings white incubating.

TECHNICAL DESCRIPTION.

Bill slightly hooked at tip; rictal bristles evident; spurious first primary present; no wing-bars.

Adult (sexes alike): Top of head dull ashy-gray, shading gradually into olive-gray on the back and pale olive-green on the rump; a whitish stripe from nostril over eye, but without any dark line above it; side of head and neck grayish-buff, this color extending along the sides of breast and body, where it becomes slightly more yellowish, but never really yellow; rest of under parts pure white or buffy white; wings and tail plain grayish, the exposed edges of feathers glossed with olive-green, but no spots or bars; bill pale brownish, lighter below; iris brown. Young birds resemble the adults closely, but are pure white below, except the under tail-coverts which are yellowish; the greater wing-coverts tipped with buffy.

Length 5 to 5.50 inches; wing 2.65 to 2.95; tail 2.10 to 2.40; culmen about .42.

258. Yellow-throated Vireo. Lanivireo flavifrons (*Vieill.*). (628)

Synonyms: Yellow-throated Greenlet.—Vireo flavifrons, Vieill., 1807, A. O. U. Check-list, 1886, and most other authors.—Lanivireo flavifrons, Lawr., 1856.

The two white wing-bars and bright yellow throat and breast are distinctive. The first primary is not spurious.

Distribution.—Eastern United States, north to Ontario and Manitoba, south in winter to Colombia. Breeds from Florida and the Gulf States northward.

This, our most brightly colored vireo, is generally distributed throughout the state, occurring everywhere during migration and nesting with some frequency in most sections of the state, but apparently more abundantly toward the north. It shows a decided preference for heavy hardwood timber, and according to many observers nests in oak woods in wet ground. According to the writer's experience it is fully as often found in orchards and along the edges of second growth woods, and its nest is as often placed in such situations as in the deep forest. Its clear flute-like song and its loud harsh scolding notes are characteristic sounds of the summer woods and the bird is not likely to pass unnoticed wherever it is at all common.

The nest does not differ essentially from that of its relatives, but in our experience is more lavishly decorated with odd and striking materials than that of any other. Not infrequently one is found half covered with bits of birch bark, insect cocoons, spiders' egg-sacs, and tufts of cotton or bits of paper, making it a decidedly conspicuous nest. We have found the nest at times within six feet of the ground and again at a height of forty or fifty feet; ordinarily it is placed from ten to twenty feet up. We have never seen one which was not distinctly pensile and if ever built otherwise it must be a rare exception.

The eggs are similar to those of the vireos already described, but aside from their somewhat larger size the spots are likely to be rather larger and browner. The eggs are commonly three or four, and average .79 by .58 inches.

Like all the other members of the family this bird is a voracious insect eater and its work is entirely beneficial to the agriculturist. It does eat a few wild fruits, but so far as we are aware no case of injury to any cultivated fruit has been recorded.

By many the song of this bird is considered finer than that of the other vireos. Probably there is much individual variation, for the writer has heard Solitary Vireos which he could not distinguish from the Yellow-throat by the song, while occasional Yellow-throats have clearer, louder and sweeter songs than any other species of his acquaintance. Bicknell says this is the only vireo which he has known to sing while on the wing.

The Yellow-throated Vireo is a little late in arriving from the south, seldom being heard, even in the southern part of the state, before the first of May, while the larger number do not arrive in the middle counties before the 10th of the month. It often lingers well into September, and Wood and Frothingham record one killed in Alcona county September 20, 1903. Nests with fresh eggs were taken by Trombley, Monroe county, May 22, 1887; by Dr. Gibbs, at Kalamazoo, June 18, 1879; by Westnedge in Kalamazoo county June 5, 1892, by Spicer in Genesee county May 17, 1888, and by Miss H. H. Wright at Saginaw, several times during the last week in May, and on June 9, 1907.

TECHNICAL DESCRIPTION.

Bill hooked at tip; rictal bristles evident; no spurious first primary; two white wing-bars.

Adult (sexes alike): Upper parts, from forehead to middle of back, bright olive-green; scapulars, lower back, rump and upper tail-coverts ashy-gray more or less tinged with olive-green; a conspicuous yellow stripe from nostril to eye, and a yellow ring about the eye interrupted in front by a dusky loral spot; sides of head and neck otherwise olive-green; entire chin, throat and breast bright yellow, the remainder of under parts abruptly white, the flanks sometimes washed with grayish; wings dark grayish, with two conspicuous white wing-bars, the tertiaries broadly edged with white; tail dark gray, most of the feathers edged with white, narrowly on the outer edges, more widely on inner edges; bill blackish above, horn-blue below; iris brown. Young similar to adults, but colors not so bright and markings not so sharply defined.

Length 5 to 5.85 inches; wing 3 to 3.20; tail 2 to 2.30; culmen .40 to .50.

259. Blue-headed Vireo. Lanivireo solitarius solitarius (*Wilson*). **(629)**

Synonyms: Solitary Vireo, Blue-headed Greenlet.—Muscicapa solitaria, Wilson, 1810. —Vireo solitarius, Vieill., 1819, A. O. U. Check-list, 1886, and most authors.—Lanivireo solitarius, Allen, 1869.

Figure 134.

Two white wing-bars, white throat and breast, yellow sides and flanks and spurious first primary are common to the Blue-headed Vireo and the White-eyed Vireo, but the latter has yellow lores and eye-ring, while these are white in the Blue-headed Vireo.

Distribution.—Eastern North America to the Plains, north to Hudson Bay and Fort Simpson. South in winter to Guatemala; breeds from northern New England and northern part of the lake states northward.

This beautiful vireo is a not very common spring migrant throughout the state, but is rather more abundant in the autumn. It is not known to nest in the southern half of the state, unless we accept Covert's statement that he found a nest and eggs of this species at Ann Arbor July 4, 1871. The builders of this nest, however, were not preserved, and we are not aware that the nest has ever been reported from any other place in the state, although the birds undoubtedly breed in the higher portions of the Lower Peninsula, as well as in parts of the Upper Peninsula. Mr. O. B. Warren states that they are seen all summer about Palmer, Marquette county, and the University of Michigan Expedition found the species in Ontonagon county July 27, 1904, where, however, it may have been migrating at that time. On Isle Royale it was noted only during migration, but of course is a summer resident.

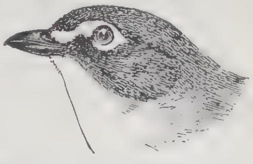

Fig. 134. Solitary Vireo. From Hoffman's Guide. Houghton, Mifflin & Co.

It arrives from the south about the first of May, the earliest record which we have being that by Mr. Swales, who found it abundant at Detroit April 29, 1905. The average date of arrival at Ann Arbor is given by N. A. Wood as

May 11, but at the Agricultural College, Ingham county, it usually arrives before the 10th of the month, dates ranging from May 2 to 10. On the return trip it has been taken at Kalamazoo September 3, 1878, and at points in the middle of the state from September 10 to 30. Individuals were killed on Spectacle Reef Lighthouse, Lake Huron, September 24, 1889 and October 3, 1893. N. A. Wood found it on the Charity Islands, Saginaw Bay, after September 25, 1910. Mr. J. Claire Wood gives his latest record for Wayne county as October 8, 1905. Although seldom an abundant bird it can almost always be found at the proper season, and sometimes is fairly numerous for a few days during migration.

In general habits, nesting and food, this species very closely resembles the Yellow-throated Vireo, and the song, at least in many instances, is also very similar. It is usually described, however, as a feebler and shorter song, but the notes are equally sweet and clear. Dr. Brewer states that the song "bears no resemblance to that of any other vireo. It is a prolonged and very peculiar ditty, repeated at frequent intervals and always identical. It begins with a lively and pleasant warble of a gradually ascending scale which at a certain pitch breaks down into a falsetto note. The song then rises again in a single high note and ceases." After reading this description one cannot but believe that Dr. Brewer has described the song of an individual Blue-headed Vireo, whose performance was decidedly unusual.

The nest is similar to that of the Yellow-throated Vireo and is commonly placed at heights varying from two to twenty feet from the ground. Like most vireo nests the exterior is often ornamented with bits of bark, moss, cocoons and other conspicuous materials. The eggs are practically indistinguishable from those of the Red-eye and Yellow-throat and average .79 by .57 inches. According to Bicknell it is one of the few migrants which are regularly in song while passing in the fall.

Prof. Aughey, of Nebraska, examined a stomach of this bird in June 1865, which contained about an equal quantity of Rocky Mountain locusts and other insects.

TECHNICAL DESCRIPTION.

Bill slightly hooked at tip; rictal bristles evident; spurious first primary present; two white wing-bars.

Adult (sexes alike): Top and sides of head ash-gray with a bluish cast; rest of upper parts rather bright olive-green, brightest on rump and upper tail-coverts, grayer on hind neck and back; a broad white streak from nostril to eye, and a white ring surrounding the eye; lores mostly dusky; sides and flanks olive-green, more or less streaked with yellow; wings dusky or dark gray, with two white or yellowish bars, and the tertiaries margined with the same; tail dusky, the outer feathers with outer web mostly pure white, the inner web narrowly white-edged; bill bluish-black; iris brown.

Length 5 to 6 inches; wing 2.90 to 3; tail 2.10 to 2.20; culmen .40 to .45.

260. White-eyed Vireo. Vireo griseus griseus (*Bodd.*). (631)

Synonyms: White-eyed Greenlet.—Tanagra grisea, Boddaert, 1783.—Muscicapa noveboracensis, Gmel., 1788.—Vireo noveboracensis, Bonap., 1824, and most other writers.—Muscicapa cantatrix, Wils., 1810.

Very similar in appearance to the Blue-headed Vireo, but decidedly smaller and with yellow lores and eye-ring instead of white. The iris, however, in the adult bird is always white, whence the name.

Distribution. Eastern United States, west to the Rocky Mountains;

north to southern New England and Minnesota; south in winter from Florida to Guatemala and Honduras. Breeds from Florida and the Gulf States northward.

This active and noisy little bird is almost unknown in Michigan, being restricted to the southernmost counties and found there so seldom as to be little more than accidental. It has been frequently confused with the Yellow-throated and Blue-headed Vireos, and to this fact we must attribute several of the records in the older lists. For example, it occurs in Kneeland's list of the birds of Keweenaw Point, Lake Superior (1856), and also in Miles' list of 1860, and two of our correspondents in the Upper Peninsula mention it as a common nesting species. Probably the bird referred to in all these cases was either the Yellow-throated or the Blue-headed Vireo, most likely the latter, since that has a distinct white eye-ring and might naturally be mistaken for the White-eye.

We are not aware of the existence of a Michigan specimen of this bird in any collection, but it has been recorded a few times on such good authority that it cannot be refused a place in the list. Jerome Trombley noted it at Petersburg, Monroe county on May 10, 11, and 12, 1885. He did not find it at any other time and thinks it possible that these records all relate to the same individual bird. Mr. Covert in his manuscript list of 1894-95 states that it was not uncommon in the neighborhood of Ann Arbor from 1868 to 1873, but that he obtained no specimens after 1876, and the only record since that time is by Mr. N. A. Wood, who recorded it as seen at Ann Arbor in May 1881. It has not been found in the neighborhood of Detroit nor has Dr. Gibbs found it in Kalamazoo county. Dr. Gibbs, however, states that D. D. Hughes, in his manuscript Ornithology of Michigan, states that he once found a nest of this bird containing one of its own eggs and three of the Cowbird's, but he gives no locality or date.

The White-eyed Vireo loves thickets and swampy briar patches, and is seldom found in places which would be favorable for any of our other species. Places suitable for the Yellow-breasted Chat would be likely to harbor this species and indeed the two birds are not unfrequently found within hearing of each other.

The song is decidedly unlike that of any of the other vireos of our acquaintance, more nearly resembling that of the Alder Flycatcher. Its ordinary call-note resembles the words "chickty-beaver," and Ridgway says that it is popularly known by this name or as the "Little Green Hangbird" in Illinois, and he has also heard its call interpreted by boys as "ginger-beer-quick."

The nest is commonly placed in the fork of a twig in some dense thicket or at the edge of a clearing, and is similar to that of the other vireos, being often ornamented externally with spiders' webs, mosses and similar materials. The eggs are four or five, pure white, thinly dotted with brown, purplish or black. They average .75 by .55 inches.

This is another of the species which was seen to feed its young on locusts in Nebraska, as recorded by Prof. Aughey. Its usual food consists entirely of insects, but it also eats berries and seeds sparingly.

TECHNICAL DESCRIPTION.

Bill slightly hooked at tip; rictal bristles evident; spurious primary present; two white wing-bars.

Adult (sexes alike): Upper parts olive-green, brightest on forehead, rump and upper tail-coverts, grayer (olive-gray) on nape and hind neck; a dusky spot on the lores, above which is a broad streak of bright yellow running from nostril over the eye, and, as a narrow line around it; cheeks washed with olive-green; throat, chest and sides of neck grayish white or pale gray; sides of breast and belly, and flanks bright sulphur yellow; middle of belly pure white; wings and tail dusky, the exposed edges glossed with olive-green, the wing with two conspicuous whitish or yellowish bars, and tertiaries broadly edged with the same; bill blackish above, horn-blue below; iris bluish-white. Young: Similar to adult, but duller; stripe from nostril over eye white anteriorly, yellowish only over the eye; sides and flanks pale buffy yellow; wing markings broader and yellower.

Length 4.50 to 5 inches; wing 2.35 to 2.50; tail 1.90 to 2.10; culmen about .40.

Family 63. MNIOTILTIDÆ. Wood Warblers.

Nearly forty species of Wood Warblers have been found in Michigan and more than thirty of them occur regularly and in some numbers. In spite of the family name most of the members are not conspicuous as singers, their voices being thin and weak or shrill and insect-like. Notable exceptions are the Ovenbird and Waterthrushes, while a dozen other species have sweet and musical songs, though commonly short and simple.

In this family the sexes as a rule are noticeably different in plumage, and young birds frequently are quite unlike their parents. Add to this the seasonal variations and it becomes apparent that the identification of species is often a difficult matter. The following purely artificial key should prove satisfactory for all adult male specimens in spring, and for a smaller number of females at the same season. It is practically impossible to construct an artificial key for beginners which will answer for immature birds. When one knows the adults fairly well he will begin to see resemblances in the young.

As with other families this key is intended for use *solely with specimens in hand.* Except under extraordinary conditions it would be entirely useless for living birds.

KEY TO SPECIES.

- A. Tail with white or colored patches. B, BB.
  - B. Tail patches white. C, CC.
    - C. Light patches or bars on the wings. D, DD.
      - D. Wing bars yellow. E, EE.
        - E. Throat black or slate colored, sides gray. Golden-winged Warbler, male and female. No. 265.
        - EE. Throat pure white, sides with more or less rich brown. Chestnut-sided Warbler, male and female. No. 276.
      - DD. Wing-bars white. F, FF.
        - F. Birds without any yellow. G, GG.
          - G. Streaked with black and white only. H, HH.
            - H. Top of head clear black. Blackpoll Warbler. No. 278.
            - HH. Top of head black with a median white stripe. Black and White Warbler. No. 261.

GG. Not simply black and white. I, II.

I. Breast and sides rich brown. Bay-breasted Warbler. No. 277.

II. Breast and sides not brown. J, JJ, JJJ.

J. Back dark blue, throat clear black. Black-throated Blue Warbler, male. No. 272.

JJ. Back light blue, throat pure white. Cerulean Warbler. No. 275.

JJJ. Back black and white, throat orange or scarlet. Blackburnian Warbler, male and female. No. 279.

FF. Birds with some yellow. K, KK.

K. Rump or upper tail-coverts yellow. L, LL.

L. Some chestnut about the head. M, MM.

M. Top of head chestnut. Palm Warbler. No. 284.

MM. Top of head mainly black, sides of head chestnut. Cape May Warbler. No. 270.

LL. No chestnut about the head. N, NN.

N. Throat white or gray. Myrtle Warbler. No. 273.

NN. Throat bright yellow. Magnolia Warbler. No. 274.

KK. Rump and upper tail-coverts without yellow. O, OO.

O. Throat and chest clear yellow. P, PP.

P. Sides with blackish spots or streaks. Q, QQ.

Q. Middle of back with patch of chestnut spots. Prairie Warbler. No. 285.

QQ. Middle of back without patch of chestnut spots. R, RR.

R. Top of head and most of back streaked with blackish. Kirtland's Warbler. No. 282.

RR. Top of head and all of back without streaks. Sycamore Warbler. No. 280.

PP. Sides without spots or streaks. S, SS.

S. Forehead and crown bright yellow, rest of upper parts bright olive green. Blue-winged Warbler. No. 264.

SS. Forehead and crown without yellow; olive green like the rest of the upper parts. Pine Warbler. No. 283.

OO. Throat and chest not clear yellow. T, TT.

T. Throat and breast yellow, but a dark band of brown or black across the chest. Northern Parula Warbler. No. 269.

TT. Throat and breast clear black, sides of head yellow. Black-throated Green Warbler. No. 281.

CC. Wings without light patches or bars. U, UU.

U. A conspicuous black hood covering the occiput and hind neck in both sexes, and the throat as well in the male. Hooded Warbler. No. 295.

UU. Head and neck rich golden yellow without trace of black. Prothonotary Warbler. No. 262.

BB. Tail patches colored. V, VV.

V. Tail patches red. Redstart, male. No. 298.

VV. Tail patches yellow. W, WW.

W. Basal half of tail mostly yellow, terminal third black. Redstart, female and young. No. 298.

WW. All the tail feathers (except middle pair) yellow on inner web the entire length. Yellow Warbler, male and female. No. 271.

AA. Tail without white or colored markings (also the wings). b, bb, bbb.

b. Under parts whitish or buffy thickly streaked or spotted with brown or black. c, cc.

c. Top of head with a broad median stripe of red-brown between two narrow black stripes. Ovenbird. No. 286.

cc. Top of head without median stripe. d, dd.

d. Culmen .43 to .50 inch, under parts thickly and narrowly streaked on a yellowish ground color. Small-billed Water-thrush and Grinnell's Water-thrush. Nos. 287, 288.

dd. Culmen .50 to .55 inch, under parts more thinly and broadly streaked on a buffy or brownish-white ground color. Large-billed Water-thrush. No. 289.

bb. Under parts bright yellow with a band or necklace of black spots across the chest. Canadian Warbler. No. 297.

bbb. Under parts without streaks or spots. e, ee.

e. Under parts mostly clear yellow. f, ff.

f. Entire throat and chest black or slate-color, sharply marked off from the yellow breast and belly. g, gg.

g. A narrow ring of white feathers about the eye. Connecticut Warbler. No. 291.

gg. White eye-ring wanting. Mourning Warbler. No. 292.

ff. Throat and chest without black (except sometimes at sides). h, hh.

h. More or less clear black on forehead or crown. i, ii.

i. Crown glossy black, forehead yellow. Wilson's Black-capped Warbler. No. 296.

ii. Forehead and sides of head and neck deep black. j, jj.

j. A bright yellow stripe from bill over and behind the eye, interrupting the black "mask." Kentucky Warbler. No. 290.

jj. No yellow about the eye, black mask continuous. Maryland Yellowthroat. No. 293.

hh. No black on forehead or crown. k, kk.

k. Large; entire upper parts olive, no rust-brown on head. Yellow-breasted Chat. No. 294.

kk. Small; back olive, head ash-gray, crown with a patch of rust-brown feathers. Nashville Warbler. No. 266.

ee. Under parts not clear yellow. l, ll.

l. Under parts somewhat yellow. m, mm.

m. Under parts yellowish white, upper parts yellowish green, no orange-brown on crown. Tennessee Warbler. No. 268.

mm. Under parts and upper parts yellowish green, an orange-brown patch on the crown. Orange-crowned Warbler. No. 267.

ll. Under parts yellowish brown or buff, top of head with four sharp black stripes and three buffy stripes. Worm-eating Warbler. No. 263.

261. Black and White Warbler. Mniotilta varia (*Linn.*). (636)

Synonyms: Black and White Creeper, Black and White Creeping Warbler, Creeping Warbler, Striped Warbler. –Motacilla varia, Linn., 1766.—Sylvia varia, Bonap., Nutt. —Certhia varia, Vieill., 1807, Aud., 1831.—Mniotilta varia, Vieill., 1818, Aud., 1839, Nutt., 1840, and most recent authors.—Certhia maculata, Wils., 1811.

Figure 135.

Size of a Canary and streaked and spotted everywhere with black and white; a white stripe through the middle of the crown.

Distribution.—Eastern United States to the Plains, north to Fort Simpson, south, in winter, through Central America and the West Indies to Venezuela and Colombia. Breeds from Virginia and southern Kansas northward, and winters from Florida and the Gulf States southward.

The Black and White Creeper, as we prefer to call it, is a common migrant throughout the entire state and a summer resident in most sections, but much more commonly in the northern part of the state. It arrives from the south with great regularity during the last days of April and the first week in May. During twelve years of observation at Petersburg, Monroe county, the earliest spring arrival was April 22, 1885 and the latest May 9, 1898. At Bay City the range was from April 28, 1897 to May 8, 1898, while at Sault Ste. Marie it was recorded May 13, 1899, and at Palmer, Marquette county, May 20, 1894 and May 7, 1895. The southward migration is not as well recorded, but the greater part of the movement takes place in September, specimens having been killed at Presque Isle Light, Lake

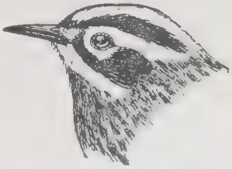

Fig. 135. Black and White Warbler. From Hoffman's Guide. Houghton, Mifflin & Co.

Huron, September 15, 1890, and on Spectacle Reef Light, September 16, 1888, September 26, 1886, September 21, 1890, and October 3, 1893. On the Charity Islands, Saginaw Bay, the first southward migrants were noted by Norman A. Wood, on August 26, 1910.

The species does not seem to be so abundant anywhere in Michigan as in the New England states and its nest has not been found very frequently. We have records of its nesting, however, in Kalamazoo county (Gibbs); Ann Arbor (Covert); Oscoda county (Wood and Frothingham); Petersburg, Monroe county (Trombley); Port Huron (Hazelwood); Marquette county (Mowbray, Warren, Wyman); St. Clair county (Swales); Wayne county (J. Claire Wood); Emmett county (Widmann); and Grand Rapids (Cole). It has also been recorded in summer from numerous other counties, where, however, neither the nest nor young have actually been seen.

The bird is one of the most interesting of our insectivorous friends, combining the habits of woodpecker, nuthatch, chickadee and warbler. It is usually seen running rapidly over the trunks and larger limbs of the trees, very much in the manner of the nuthatch, but occasionally stopping and prying deeply into some crevice in the manner of a woodpecker. At other times it may be seen following a leafy branch to its tip, traveling sideways by little leaps and hops, or running rapidly like any other warbler.

Its song, if such it can be called, is an unpretentious twitter which Seton Thompson describes as "a thin twitter like a Cedar-bird in a hurry, which may be suggested by the syllables 'chipiti, chipiti, chipiti, chipiti,' uttered faster and faster until it becomes a mere twitter" (Birds of Manitoba, p. 616). Although not loud or striking this call is perfectly characteristic, and when once the observer becomes familiar with it he will find the bird frequently when otherwise it would be overlooked.

The nest is placed on the ground, invariably, so far as our experience goes. It seems to be characteristic of the bird to place the nest close to or under some protecting shelter, sometimes a log, again the root of a tree, more rarely the side of a grassy bank, but most commonly of all the edge of a projecting rock. Among a score of nests examined, at least half were under or close to stones of varying size. The nest is sunken in the ground, deeply hollowed, and sometimes partially closed over at the top. It is built of various fine fibrous materials in which long hairs of horse or cow are always prominent.

The eggs are four to six, white, with reddish brown dots, thickest about the larger ends, and average .67 by .57 inches.

This species is frequently imposed upon by the Cowbird, and we have seen five young Creepers and two young Cowbirds, all nearly grown, in the same nest, the Creepers, however, being emaciated and hardly likely to survive.

The food is much like that of other warblers, but a larger proportion of it is taken from the trunks and limbs of trees and a smaller proportion from the foliage itself, while some is gathered from the ground. Insects in various stages form by far the greater part, but the bird also eats a few berries and seeds. It seems to be particularly fond of plant-lice and may often be seen gorging itself on these insects during early spring and again in the fall.

TECHNICAL DESCRIPTION.

Adult: Upper parts streaked with black and white, black predominating; under parts similarly streaked but white predominating; two white wing-bars; two outer pairs of tail feathers with white spots on inner web near tip. The young male is similar, but the throat is white, and without streaks. The adult female is similar to the young male, but the markings not so sharp or strong, and the sides are usually washed with brownish.

Length 4.55 to 5.50 inches; wing 2.60 to 2.90; tail 1.95 to 2.25.

262. Prothonotary Warbler. Protonotaria citrea (*Bodd.*). (637)

Synonyms: Golden Warbler, Golden Swamp Warbler, Willow Warbler.—Motacilla citrea, Boddaert, 1783.—Helminthophaga citrea, Cab., 1861.—Sylvia protonotarius, Vieill., Wils., Bonap., Nutt., Aud.—Protonotaria citrea, Baird, 1859, and most subsequent authors.

Entire head, neck and under parts rich yellow or orange without streaks; tail with big white patches, no wing-bars.

Distribution.—Eastern United States, west to Nebraska and Kansas, north to Virginia, southern Michigan and Iowa, casually to New England, Ontario, and Minnesota; in winter, Cuba and Northern South America. Breeds throughout its United States range.

This bird reaches the northern limit of its range in Michigan and appears to be confined almost or quite to the southern portions of the state. Ordinarily it is a rare bird and is met with singly or in small colonies here and there in the overflowed swamps which are its peculiar habitat. In only two localities in the state, so far as we are aware, has it been recorded as abundant. Mr. H. W. McBride states that it was found abundantly along the St. Joseph River in Motville township, St. Joseph county, Michigan, and for a distance of three and one-half to four miles along the river from White Pigeon was to be seen or heard all the time. This was in May 1891 (Butler, Birds of Indiana, 1897, pp. 1022-1023). During the summer of 1907, E. R. Kalmbach and H. A. Moorman, while on a canoe trip down the Grand River, found this beautiful warbler in numbers at certain favorable places in Jackson and Ingham counties, and in lesser numbers as far as Dimondale, Eaton county. This was between June 17 and July 1, and nests containing eggs were not uncommon, although others contained young.

A. B. Covert and N. A. Wood of Ann Arbor found a pair breeding in the dense swamp in Lyons township, Oakland county, May 8,1896, and the nest and female are now in the Museum of the University of Michigan at Ann Arbor. A single specimen was noted at Grosse Pointe Farms, Wayne county, May 9, 1903, by A. B. Covert and A. W. Blain, and a female was found dead under an electric light tower in Grand Rapids, Kent county, May 13, 1905, the skin being now in the possession of H. A. Moorman. In the summer of 1905 a pair of these birds occupied a mailbox or letterbox fastened to a veranda post of residence No. 35 Coldwater St., Kalamazoo. They began nesting in the box on May 19 and five young were reared. The occupant of the house, Mrs. C. A. Pierre, furnished Mr. P. A. Taverner with a full account of the nesting and he also examined the nest. The Kalamazoo River, bordered by a fringe of willows, flows within a few rods of the back of the house.

During the summer of 1906 a pair nested in a woodpecker's hole in a small tree standing in water caused by an overflow of the Grand River about four miles north of Jackson, Jackson county. Mrs. Robert Campbell, of Jackson, first saw them on May 29, and again occasionally until the young left the nest. She says: "The song is loud and well sustained, but not long or rythmically well marked enough for one to want to put words to it. The Yellow Warbler, Northern Yellowthroat and Warbling

Vireo were singing at the same time, but the Prothonotary's song was louder than any of these. It reminded me more of the Louisiana Water-thrush than any other song and was of a very sweet quality." Mrs. Campbell also noted that the female gathered some sort of food from the surface of the water or the bog, going only a short distance from the nest for it, but she was unable to tell just what the food was.

The northernmost of these records (Grand Rapids) is approximately in latitude 43 degrees, and we have but one report of the occurrence of this warbler at any more northerly point in the state. A specimen was picked up dead on the morning of May 26, 1907, at Saginaw, by Miss Harriet H. Wright, who states that it was after a night of sleet and snow, and several days of bad weather, which proved fatal to many other warblers.

As already indicated this bird is remarkable for the regions which it frequents and particularly for the manner of its nesting. It seems to select invariably the wettest swamps, being partial to regions of overflow, where the water stands for weeks or perhaps months among the trees alongside the river. In such situations it selects a decayed stump in which a deserted woodpecker's hole or some natural cavity exists, and in this, usually not more than five or six feet above the surface of the water, the nest is built. This is made of various soft substances, but according to Brewster "fresh green moss enters largely into its composition, and although this substance is readily obtained, a week is sometimes consumed in building the simple little affair. * * * The shape and size vary with that of the cavity in which it is placed. When the hole is deep it is usually built up to within four or five inches of the entrance. * * * When the cavity is shallow it is often only scantily lined with moss and a few fine roots." Dry leaves, fine twigs and a few feathers are often added to the nest materials.

The eggs vary in number from four to seven, although occasionally the female appears to sit on only one or two eggs. These are clear white, highly polished, and spotted with pale lavender and reddish-brown. They average .68 by .55 inches.

TECHNICAL DESCRIPTION.

Adult male: Head, neck and entire under parts, with the exception of the under tail-coverts, rich bright yellow; under tail-coverts white; interscapular region greenish-yellow, usually in rather marked contrast with the head; lower back, rump and upper tail-coverts bluish ash; wings and tail slate-color margined with ash, the wings unmarked, the tail-feathers, except the middle pair, with large white blotches on the inner web; bill black. Female similar but duller, the top of the head usually olive-green and the ash of the wings and back less pure.

Length 5 to 5.50 inches; wing 2.90 to 3; tail about 2.25. Sexes alike in size.

263. Worm-eating Warbler. Helmitheros vermivorus (*Gmel.*). (639)

Synonyms: Worm-eating Swamp Warbler, Worm-eater.—Motacilla vermivora, Gmelin, 1789.—Sylvia vermivora, Wils., Nutt., Aud.—Helinaia vermivora, Aud., 1839.—Helmitheros vermivorus, Baird, 1858, A. O. U. Check-list, 1886, and most subsequent authors.—Vermivora pennsylvanica, Swains., Jard., and a few others.

Top of the head striped with three buff and four black lines; under parts buffy, without streaks or spots; no wing-bars; tail without spots.

Distribution.—Eastern United States, north to southern New York and southern New England, west to eastern Nebraska and Texas; south in winter to Cuba and northern South America. Breeds throughout its United States range.

The right of the Worm-eating Warbler to a place in the Michigan list seems to rest largely on the record of A. B. Covert, who states that he took a male at Ann Arbor, Washtenaw county, May 21, 1878. The specimen, however, has been lost sight of. The species is mentioned in Stockwell's list in Forest & Stream as a rare visitant to the southern counties (F. and S., VIII, 261), and it occurs in Cook's list of 1893 on the authority of Major Boies, of Hudson, Lenawee county. Major Boies, however, appears never to have taken a specimen and possibly was mistaken in recording it for Lenawee county. Dr. Gibbs has never found it in Kalamazoo county, but notes D. D. Hughes' statement that one was taken in June 1868, by a Mr. Hurd. That most careful observer, Jerome Trombley, has failed to note it at Petersburg, Monroe county.

Butler states that he does not know of its occurrence in northeastern Indiana beyond the Wabash river, but says that it has been taken on the shore of Lake Michigan at Waukegan, Illinois, above Chicago, May 21, 1876 (Birds of Indiana, 1897, p. 1027). Kumlien and Hollister also record a single specimen taken at Lake Koshkonong, southern Wisconsin, in May 1873, and another in May 1877.

The Worm-eating Warbler has been reported from time to time from various parts of Michigan, even from the Upper Peninsula, by observers who were unquestionably honest, but mistaken. The bird is a southern form which enters the state, if at all, only at long intervals and in small numbers. Undoubtedly females and immature specimens of the Black and White Warbler have been occasionally mistaken for the Worm-eating Warbler, but this mistake would never occur had the observer ever handled an actual specimen of the latter bird.

TECHNICAL DESCRIPTION.

Adult: Color mainly dull buff below and olive-green above, but the top of the head with two broad black stripes running from bill to nape, enclosing a large area of buff, and bordered on the outside by another buff stripe, and this in turn bounded by a narrow black line which starts at the eye and runs backward to the nape. Buff of the under parts strongest on the breast, lightest on the throat and belly; wings and tail drab, margined above with olive-green, the outer-tail feathers with narrow white margins on the inner web near the tip; bill brownish-black. Sexes alike.

Length 5 to 5.75 inches; wing 2.65 to 2.90; tail 1.90 to 2.20. Female slightly smaller.

264. Blue-winged Warbler. Vermivora pinus (*Linn.*). (641)

Synonyms: Blue-winged Yellow Warbler, Blue-winged Swamp Warbler.—Certhia pinus, Linn., 1766.—Helminthophaga pinus, Baird, 1858, and many others.—Helminthophila pinus, Ridgw., 1882, A. O. U. Check-list, 1886, and most subsequent authors.—Sylvia solitaria, Wils., Nutt., Aud.—Helmitheros solitarius, Sclater. (This must not be confounded with the Pine Warbler, No. 283.)

Crown and under parts rich yellow; a black stripe through the eye; two white or yellowish wing-bars; three or four pairs of tail-feathers with white blotches.

Distribution.—Eastern United States, from southern New York, southern New England, and southern Minnesota southward, and west to Nebraska and Texas. In winter, south to Mexico, Guatemala and Nicaragua.

This is another rare warbler which appears to have been taken less than a dozen times within our limits. It is a southern species, partial to swamps and rich moist woodlands, where it appears to have essentially the same habits as its near relative the Golden-winged Warbler. Trombley records a single specimen seen at Petersburg May 10, 1897, and Dr. Gibbs states that A. E. Chambers of Kalamazoo secured a specimen there May 5, 1879. There are two records for Wayne county, a pair seen by J. Claire Wood, May 29, 1902, and a male taken by the same collector, in Ecorse township, May 9, 1906. Mrs. Robt. Campbell also reports seeing one at Jackson May 18, 1906. Mr. S. E. White furnishes the northernmost record, as follows: "On Sunday July 1, 1889 [on Mackinac Island] I saw a fine male of this species in an evergreen tree. He permitted the closest scrutiny, sometimes approaching within a few feet of my head in a search for food. I could not find him again the next day" (Birds of Mackinac Island, Auk, X, 1893, 227). There are also two records for Ann Arbor, Washtenaw county, one a female taken May 1, 1896, and now in the University collection, the other a male in Mr. Norman A. Wood's collection, taken May 6, 1904. The Blue-winged Warbler occurs in Stockwell's Forest and Stream list (Vol. VIII, p. 261) where it is stated that it is a "frequent visitor in southern Michigan and has been seen as far north as Genesee county," a statement which hardly seems warranted by the facts.

The nest is placed on the ground and is similar to that of the Golden-winged Warbler. The eggs are three to five, white, finely dotted with brown, and average .60 by .48 inches.

TECHNICAL DESCRIPTION.

Adult male: Entire under parts from chin to vent rich golden yellow; under tail-coverts white; forehead and crown yellow like the breast, but often somewhat obscured by olive tips; remainder of the head, back and rump, rich olive-green; wings and tail slate-gray margined with bluish-ash, the outer tail-feathers (three pairs) with large white spots on the inner webs; two white or yellowish-white wing bars of variable width; lores and line behind the eye black or blackish. Female similar, but somewhat duller, the wing-bars and black markings of the head less conspicuous.

Length 4 to 5 inches; wing 2.40 to 2.50; tail about 2.

White-throated Warbler. Vermivora leucobronchialis (*Brewst.*).

Synonyms: Brewster's Warbler.—Helminthophaga leucobrochialis, Brewster, 1874, and others.—Helminthophila leucobronchialis, Palmer, 1885, A. O. U. Check-list, 1886. —Helminthophaga gunnii, Gibbs.

Similar to the Blue-winged Warbler, the throat silky white and breast more or less tinged with yellow; wing-bars often bright yellow. Distribution probably identical with that of the Blue-winged Warbler, of which this probably should be considered only a variant.

Apparently there are but two records of this bird for the state, one taken by W. A. Gunn, May 25, 1879, near Grand Rapids, but in Ottawa county (Bull. Nutt. Orn. Club, IV, 1879, 125), and the other taken by N. A. Wood, at Ann Arbor, May 18, 1902 (Auk, XIX, 1902, 401).

This is a doubtful form which has been the occasion of much speculation for the last twenty years. For a time it was believed to be a hybrid between the Blue-winged and Golden-winged Warblers, but the latest verdict seems to be as given by Dr. Bishop (Auk, XX, 1905, 24). "The conclusion seems to me to be irresistable that *H. leucobronchialis* is merely a leucochroic phase of *H. pinus*, which from its appearing frequently only within a very limited area, may in time become a species."

In general habits and song this species does not differ noticeably from the Blue-winged Warbler.

TECHNICAL DESCRIPTION.

"Adult male: Forehead, and fore part of the crown yellow, a black line from the bill through the eye; rest of the upper parts bluish gray; wing-bars broadly yellow; tail like the back, three to four outer feathers marked with white; under parts pure white, *faintly* washed with yellow on the breast. Fall specimens are more heavily washed with yellow, and the upper parts are margined with olive-green. Adult female: Similar, but wing-bars white, and crown not so bright" (Chapman).

265. Golden-winged Warbler. Vermivora chrysoptera (*Linn.*). (642)

Synonyms: Golden-winged Swamp Warbler, Blue Golden-winged Warbler.—Motacilla chrysoptera, Linn., 1766.—Sylvia chrysoptera, Vieill., Wils., Nutt., Aud.—Helminthophaga chrysoptera, Baird, 1858. -Helminthophila chrysoptera, Ridgw., 1882, A. O. U. Check-list, 1886, and most subsequent writers.

Crown and patch on wing bright yellow; throat and band through the eye black, with white line between; three or four pairs of tail-feathers white blotched.

Distribution.—Eastern United States, north to southern New England, southwestern Ontario and southern Minnesota; breeding from northern New Jersey and northern Indiana northward, and southward along the Alleghanies to South Carolina. Central America and northern South America in winter.

This beautiful warbler is irregularly distributed over the southern half of the Lower Peninsula during summer, arriving from the south about the first to the twelfth of May, and retreating southward in August or early September. Probably it nests wherever found, although it is reported at several points in the Lower Peninsula as a migrant only. This is one of the warblers which have varied in numbers remarkably in late years. Fifteen or twenty years ago it was very abundant in Monroe county, where Mr. Trombley found it nesting commonly; at present it has almost disappeared from that region. In the neighborhood of Lansing, from 1895 to about 1898, it was also fairly abundant, probably exceeding in numbers the common Yellow Warbler, although that species was far from abundant. Since 1900, however, the Golden-wing has not been noticed frequently, and although a few nest here every season it is far from common. It is reported as a common breeder near Detroit by Swales, J. C. Wood and Taverner; as common and breeding at Manchester (Watkins); Grand Rapids (Cole); Ann Arbor (N. A. Wood, R. H. Wolcott, A. B. Covert.) At Kalamazoo it was formerly a regular migrant and breeder, but never very abundant, and the same appears to be the case at Port Huron where Mr. Hazelwood notes it as a migrant, but thinks it does not nest. The most northern record for the state is Mackinac Island, where Mr. S. E. White states that in 1891 a number were constantly observed up to July 26, although none had been seen in the two previous years. It was not found by Wood and Frothingham in Otsego, Crawford, Oscoda or Alcona counties, nor has the writer found it at any of the points visited in the upper part of the Lower Peninsula. So far as our present information goes the bird is practically restricted to the region south of the forty-fourth parallel and its occurrence north of that point must be considered as purely accidental.

The nest is placed invariably on the ground, usually in the edge of woods or in bushy pastures, often at the foot of a shrub or tree, and usually well hidden. It is built of various fibrous materials and often lined with fine roots and hair. The eggs are four or five, white, speckled with brown, chiefly at the larger end, and average .64 by .53 inches.

The song of the Golden-wing is hardly more than a lisping twitter, consisting of a repetition of the syllables see, see, see or tseep, tseep, tseep.

The food like that of the other members of the genus, consists mainly of insects, and so far as we know has no marked peculiarities.

TECHNICAL DESCRIPTION.

Adult male: Forehead and crown bright yellow, the rest of the upper parts bluish gray, and this color shading the sides below; lores, cheeks and most of the throat and upper breast velvet black; a white stripe above the eye, another and broader one running backward from the base of the lower mandible to the side of the neck, separating the black of the cheeks from that of the throat; middle of the breast and belly white, sometimes in full plumage tinged with yellow; two conspicuous yellow wing-bars, often so broad as to run together into a single large patch; three outer pairs of tail-feathers with large white blotches on the inner webs; bill black. Adult female similar, but the black areas all replaced by light slate, and the yellow of the crown mostly replaced by bright olive-green.

Length 4 to 5 inches; wing 2.40 to 2.50; tail about 2.

266. Nashville Warbler. Vermivora rubricapilla rubricapilla (*Wilson*). (645)

Synonyms: Nashville Swamp Warbler.—Sylvia rubricapilla, Wilson, 1812.—Sylvia ruficapilla, Aud., 1831.—Helminthophaga ruficapilla, Baird, 1858.—Helminthophila ruficapilla, Ridgw., 1882, A. O. U. Check-list, 1886.—Vermivora rubricapilla, Sw. and Rich., 1831.

Mainly olive above and bright yellow below, without spots or streaks; crown bluish-gray with a partly concealed reddish-brown or chestnut patch; no wing bars or white tail spots.

Distribution.—Eastern North America to the Plains, north to the Fur Countries, breeding from northern United States northward. Mexico and Guatemala in winter.

This little warbler is a rather common migrant throughout the state and a frequent summer resident throughout the northern half of the Lower Peninsula and most of the Upper Peninsula. It seems to have a preference in summer for tamarack swamps and low lying tracts of evergreens, especially about the margins and openings, but during migration it is found in all sorts of situations, perhaps as often in orchards as elsewhere. In spite of the fact that it invariably nests on the ground, the bird keeps well up in the tops of trees during its migration and apparently gets the larger part of its food from such places. We do not recall ever having seen one on the ground, or searching for food within a foot or two of the ground. The food consists mainly if not entirely of insects, and the bird would be decidedly beneficial were it more abundant.

The nest is usually well hidden in the thick herbage, or among the moss, in comparatively low ground, and it has been repeatedly found embedded in the peat moss (*Sphagnum*) so common in tamarack swamps. It is neatly made, deeply hollowed, and consists of fine grasses, roots and similar materials, often lined with long hairs. The eggs are three to six, most often four or five, creamy white, thickly and minutely spotted with reddish brown. They average .61 by .47 inches.

The distribution in the breeding season is not well made out in Michigan, since the bird is apparently not abundant anywhere during the nesting season. So far as we are aware no nest has been found in any of the four southern tiers of counties, and the bird is reported as a migrant only at Plymouth, Petersburg, Kalamazoo, Grand Rapids and Ann Arbor. On the other hand, Dr. Gibbs found it a summer resident in Montcalm county; Dr. Dunham in Kalkaska county; Widmann in Emmet county, and several observers in various parts of the Upper Peninsula. It usually arrives from the south rather late, and an average date for Lansing would be about May 10. Mr. Swales, however, states that it arrives in the neighborhood of Detroit from April 26 to May 3, remaining through the middle of May; and that it returns again in early September, remaining through the month. Specimens were killed on Spectacle Reef Light, northern Lake Huron, May 10 and 11, 1888, and September 26, 1886, September 24, 1889, and September 21, 1890. In the southern part of the state it not infrequently lingers until the first week in October, being thus one of the latest of our migrants to move south.

The song in Manitoba, is described by Seton Thompson as a warble "something like that of the Summer Warbler, and may be rendered, 'toit toit toit toit chip-it-e-ip-it-e ipitiipitipitipiti,' the last part being a continuous twitter."

TECHNICAL DESCRIPTION.

Adult male: Crown with a chestnut patch, often more or less hidden; rest of the head and neck above, bluish-ash; back, rump and upper tail-coverts olive-green, the wings and tail dusky, edged with olive-green; entire under parts, including under tail-coverts, bright golden yellow, sometimes washed with olive on the sides of the breast and belly; a white ring around the eye; tail-feathers sometimes narrowly edged on inner webs with whitish, but without white patches. Female similar, but somewhat duller, the chestnut crown patch often nearly invisible. In autumn the ash of the upper parts is browner, the yellow below is duller, and the eye-ring is buffy instead of white.

Length 4.20 to 5 inches; wing 2.25 to 2.45; tail 1.80 to 1.90. Female slightly smaller.

267. Orange-crowned Warbler. Vermivora celata celata (*Say*). (646)

Synonyms: Orange-crown.—Sylvia celatus, Say, 1823, Bonap., Nutt., Aud.—Helminthophaga celata, Baird, 1858. —Helminthophila celata, Ridgw., 1882, and most subsequent authors.

Very similar to the Nashville Warbler, but more greenish-yellow below; the crown patch orange or reddish-yellow instead of chestnut.

Distribution.—Eastern North America, breeding as far northward as the Yukon and Mackenzie River districts and southward through the Rocky Mountains, and wintering in the South Atlantic and Gulf States and Mexico.

The Orange-crown probably is the least common of its genus found in the state. In fact it should not be spoken of as common at all, being a decidedly rare bird. Presumably it is a migrant only, arriving from the south at about the same time as the Nashville and departing also at about the same time. This species was not mentioned by Dr. Sager in 1839, or by Cabot in 1850. Boies included it in his list of 1875, Covert in his lists of 1878 and 1881, and Dr. Atkins took three specimens at Locke, Ingham county, between September 11 and October 1, 1880. Dr. Gibbs never met with a specimen alive near Kalamazoo, but states that Mr. F. H. Chapin secured one in that county. Covert took one at Ann Arbor April 23, 1879 and another on May 7 the same year. Norman A. Wood has a specimen taken at Ann Arbor, and another collected on Charity Island, Saginaw Bay, September 29, 1910. Swales and Taverner took a specimen in St. Clair county September 25, 1904, and J. Claire Wood took a single specimen in Wayne county May 9, 1906, and three more May 16, 1909. There are four records of the Orange-crowned Warbler for Spectacle Reef Light, Lake Huron, viz., May 24 and 25, 1894, August 30, 1894, and September 20, 1887.

The bird is equally rare in the territory adjoining Michigan. In Indiana Butler states that it is the rarest bird of its genus, known only as a migrant, often entirely wanting for years together, and rarely seen in any numbers. In nineteen years in Franklin county he has found it but four times (Birds of Indiana, 1897, 1035). In Wisconsin, according to Kumlien and Hollister, it is nowhere abundant, but seems considerably more common in the western part of the state. In Ontario it is also far from common; McIlwraith (1894) records five specimens, and a few more have been seen since.

As already stated it is not known to nest in Michigan and its summer home is in the far north, even well into the Arctic Circle. The nest and eggs are almost precisely like those of the other members of the genus, and the eggs average .63 by .49 inches.

Seton Thompson states that the song is much like that of the Chipping Sparrow, but more musical and in a higher key. So far as we are aware it has not been heard to sing while with us during migration, its only note being the sharp "tsip" common to a majority of the warblers.

TECHNICAL DESCRIPTION.

Similar to the Nashville Warbler, but the crown patch brownish orange instead of chestnut, and the remainder of the upper parts olive-green without any bluish-ash; under parts from chin to under tail-coverts yellowish-olive, more dusky on the sides; no evident eye-ring. Young similar, but duller and without any crown patch or with only a trace. Of the same size as the Nashville.

268. Tennessee Warbler. Vermivora peregrina (*Wilson*). (647)

Synonyms: Tennessee Swamp Warbler.—Sylvia peregrina, Wilson, 1811, Bonap., Nutt., Aud.—Vermivora peregrina, Sw. & Rich., 1831.—Helminthophaga peregrina, Baird, 1858, and most other writers until 1882.—Helminthophila peregrina, Ridgw., 1882, and most subsequent authors.

Very similar to the Nashville, but the crown without any colored patch, the back and rump bright olive-green, and the under parts white or whitish, without spots or streaks, and at most with only a tinge of yellow.

Distribution.—Eastern North America, breeding from northern New York and northern New England northward to Hudson Bay Territory; in winter, south through eastern Mexico to Costa Rica and Colombia.

This is a warbler which occurs in variable numbers in different years and which must be considered a migrant only, at least for the greater part of the state. Occasionally it appears in considerable numbers, especially in the fall, when it is seen in small flocks of a dozen or more individuals, and these are met with frequently and for several days in succession, ordinarily in late August or early September. Again for a year or two few will be seen either in spring or fall, and apparently it is always much less common in spring. It has been reported in the fall from all parts of the state.

It is rather late in its arrival from the south, coming from the 10th to the 15th of May, in the neighborhood of Detroit, and from the 20th to the 30th in the northern part of the state. The records of specimens killed on Spectacle Reef Light, are May 23, 1897, May 28, 1892, September 5 and September 29, 1889, September 29, 1887 and October 3, 1893. Mr. J. Claire Wood states that in Wayne county "not even a straggler was seen in 1904, but it was the most common species in 1905 from August

24 to September 10, and was last seen October 12." As a rule he considers it "the most common woodland migrant in autumn." In Wisconsin, according to Kumlien and Hollister "It is usually an extraordinarily abundant migrant, especially in the fall, at some seasons far outnumbering any other species. * * * No authentic record of it as a summer resident, although it is at times common, even in the southern counties, by August 15th."

From three independent sets of observations it seems fairly certain that this species occasionally nests in the higher or more northern parts of the state. Mr. Walter M. Wolfe found young just able to fly, near Beulah, Benzie county, August 4, 1906. He writes: "I secured one adult, then a young bird too badly mutilated for identification, and finally another young bird that clearly settled the case." Mr. Gerard A. Abbott, of Chicago, writes us under date of October 2, 1906: "The Tennessee Warbler was seen in Oscoda county, Mich., late in June 1906, but no nests were discovered, though they were certainly breeding." Mr. Norman A. Wood, of Ann Arbor, writes: "None of our party saw this warbler [the Tennessee] at the Porcupine Mountains (Ontonagon Co.) during the month we were there, July 13 to August 15, 1904. Our earliest record at Isle Royale was on August 2, 1905, at Siskowit Bay. We did not see any at the northeast end of the island in July, but it was not a favorable place for them to breed, so I am sure a few bred on the island, as the migrants did not seem to come until about August 15, and the greatest number on August 30."

The bulk of the species is believed to nest far north, even within the Arctic Circle. Several nests were taken in June 1901 in Cariboo, British Columbia, by Mr. Allan Brooks, and are described by J. Parker Norris in the Auk, Vol. XIX, pp. 88-89. The eggs are there described as somewhat different from the other members of the genus in being spotted with a few larger red brown spots in addition to the usual fine markings, and also with a number of spots of light lilac. The eggs averaged about .60 by .46 inches. The nests were placed on the ground at the foot of small bushes and arched over by dry grass.

The food of this species is of peculiar interest because it is one of the few warblers which have proved to be destructive to fruits in a peculiar way. The Tennessee Warbler is known to puncture ripe or ripening grapes and to suck the juice, thereby causing the decay of the berries so punctured and attracting yellow-jackets, bees and other nectar-loving insects so that whole clusters are sometimes ruined. This work was long attributed to orioles, catbirds and various other species, but has now been definitely fixed on the present species and cannot be denied. Doubtless in some cases the damage so done is considerable, but usually the birds are so scarce that the amount of fruit damaged is absolutely insignificant. Like numerous other warblers this species eats the berries of sumac and poison ivy, and, disgorging the seeds afterward, of course spreads these poisonous plants. Except for these two habits the bird is undoubtedly beneficial, since its food consists mainly of insects, among which are immense numbers of leaf-destroying forms, and in particular, plant-lice and the minute leaf-rollers and other forms which few but the warblers capture. Prof. Forbes examined a single stomach of this species taken in 1882 in an orchard overrun with canker worms and found that four-fifths of its food consisted of canker worms and the remainder of a single species of beetle, *Telephorus bilineatus.*

TECHNICAL DESCRIPTION.

Adult male: Top and sides of head gray, the back, rump and upper tail-coverts bright olive-green; wing and tail feathers dusky, edged with olive and often margined at the tips with white; a yellowish white streak from the forehead over the eye; under parts white or grayish white, purest on the belly and under tail-coverts, grayer and often yellowish on throat and breast; no wing-bars or conspicuous tail-markings. Adult female similar to male, but with some olive-green on the top of the head and the under parts usually washed with yellowish. Rather larger than the Nashville.

Length 4.50 to 5 inches; wing 2.75; tail 1.60 to 2.

269. Northern Parula Warbler. Compsothlypis americana usneæ *Brewst.* (648a)

Synonyms: Blue Yellow-backed Warbler, Blue Yellow-back, Northern Blue Yellow-back.—Sylvia americana, Bonap., 1826.—Parula americana, Bonap., 1838, and most authors until 1884.—Compsothlypis americana, Stejn., 1884, part, A. O. U., Check-list, 1886, part, and most recent authors.—Compsothlypis americana usneæ, Brewster, 1896.

Smallest of our warblers. Gray-blue above, with a conspicuous patch of greenish-yellow in the middle of the back; throat and breast mainly yellow, the latter with a broad girdle of mottled chestnut and black; two white wing-bars, and half the tail-feathers white spotted.

Distribution. -New England, New York and westward along the northern tier of states, and northward into the Maritime Provinces and Ontario, migrating southward beyond the United States in winter.

This beautiful little warbler is not uncommon during migration in most parts of the state, although it seems to be irregularly distributed. It is rather late in arriving from the south, although S. E. White reported it at Grand Rapids in 1890 as early as April 22, and again on April 30 and May 2. In Ingham county it usually comes between the 5th and 15th of May, and specimens have been killed on Spectacle Reef Light, Lake Huron, as early as May 5 and 7, 1889 and May 11, 1888, while others struck that light on May 17, 1885, May 19, 1893 and May 21, 1891. The species also remains rather late in the fall, since specimens were killed on Presque Isle Light, Lake Huron, September 15, 1890, Spectacle Reef Light, September 17, 1893, and one was taken on Charity Island, September 26, 1910 (N. A. Wood). Undoubtedly a good many linger until the latter part of September, and Mr. Swales records one in the neighborhood of Detroit October 14, 1905, and J. C. Wood took one October 16, 1909.

In its habits it combines the actions of warbler, chickadee and kinglet, as it often hangs head downward from a terminal bud or a bunch of leaves, and frequently hovers like a kinglet before a leaf or flower. It also creeps up and down branches, and in fact takes any position possible to any one of our small birds.

Its food seems to consist entirely of insects, and it must be very useful to the horticulturist in its destruction of plant-lice, leaf-rollers and span-worms. During its migration it is perhaps rather more likely to be found among hardwood growths than among the evergreens, but its presence seems mainly determined by the abundance of its insect food and it frequents alike willow thickets, orchards and the tops of the higher forest trees.

Undoubtedly it nests throughout a large part of the state, but owing to the character of the places frequented it is seldom noted during the nesting season, and the nest appears to have been found only a few times.

Mr. Covert informed Dr. R. H. Wolcott that he found it nesting at South Lyons, Washtenaw county, in 1895, and Mr. Covert states in his manuscript list of 1894-95 that D. C. Worcester found a nest in a tamarack swamp near Ann Arbor, May 17, 1893. Mr. L. J. Cole tells us that he suspects that the bird breeds in the low places among the sand dunes near Grand Haven, Ottawa county, and the writer has found it during the nesting season near Petoskey, Emmet county, although no nests were actually found.

The subspecies was named *usneæ* by Mr. Brewster from the fact that so far as observed it nests invariably in masses (usually pensile) of the so-called "Beard-moss," belonging to the genus *Usnea* which so frequently festoons the trees in swampy places and overflowed woodlands. The bird selects a swinging mass of this moss and in its interior builds a neat nest, mainly of pieces of the moss itself, but sometimes with a few rootlets and hairs interwoven, the nest being usually arched over or completely closed at the top, with the entrance through a hole in the side. Not infrequently the nest is within two or three feet of the water, and instances are recorded where many of these nests have been destroyed by the rising of the water in heavy freshets. Ordinarily, however, they are placed from five to twenty feet above the water (or ground) and are so skilfully concealed as to be found only by patient watching of the birds. The eggs are three to five, white, speckled with reddish brown, and average .64 by .46 inches.

According to Bicknell it has two different songs. In one the notes coalesce into a fine insect-like trill; in the other four similar notes are followed by four others, weaker and more quickly given.

TECHNICAL DESCRIPTION.

Adult male: Upper parts, from forehead to tail, bright grayish blue, with a patch of greenish yellow in the middle of the back; sides of head and neck blue like the back, this color extending along the sides of the breast and belly; lores black; a white spot on the lower eyelid; two conspicuous white wing-bars; chin and middle of breast clear bright yellow; throat and upper breast mixed black, brown and yellow; belly and under tail-coverts white; most of the tail feathers with white spots which are large and squarish on the outer two pairs. Female similar, but less brown and black on throat and breast, these parts often being entirely yellow; upper parts duller blue, and white wing-bars narrower.

Length 4.10 to 4.90 inches; wing 2.20 to 2.40; tail 1.60 to 1.85.

270. Cape May Warbler. Dendroica tigrina (*Gmelin*). (650)

Synonyms: Motacilla tigrina, Gmelin, 1789.—Sylvia tigrina, Vieill.—Dendroica tigrina, Baird, 1858.—Dendrœca tigrina, Newton, 1859.—Perissoglossa tigrina, Baird, 1865.—Sylvia maritima, Wils., 1812.

Plate LVIII.

The sooty-brown crown, yellow rump, and conspicuous chestnut or orange-brown patch on the side of the head, are sufficient to identify this bird in spring. In addition it has much white on the wings and in the tail, while the under parts are rich yellow, streaked with black.

Distribution.—Eastern North America, north to Lake Winnipeg and the Hudson Bay Territory, west to the Plains. Breeds from northern New England northward; winters in the West Indies.

This, one of our most beautiful warblers, has been regarded by most observers as decidedly rare. It is, however, less uncommon than is generally supposed and doubtless occurs in some numbers during the migrations in all places where warblers are at all numerous. It arrives from the south from the first to the middle of May, more often later than earlier. Specimens were killed on Spectacle Reef Light, Lake Huron, May 11, 1888 and May 22, 1890, while on the southward migration they struck the same light September 7, 1888 and September 25, 1889, and one was killed on Pt. Oneida Light, September 27, 1886.

Usually the Cape May Warbler appears with the opening of the apple blossoms, and it seems to have a preference for blossoming trees, possibly because it feeds largely upon the hymenoptera and diptera which are attracted by the nectar. It seems at all times to prefer rather open woods, and we have seen it more often in the shade trees of city streets and parks than any other warbler which is at all rare. Usually it is very tame and unsuspecting, and especially in the fall, when it is fairly common, it moves in the most leisurely manner and often spends half an hour or more in the same tree.

Its nesting habits are but imperfectly known. No instance of its nesting in Michigan has come to our notice, yet the northern counties of the state are certainly within its nesting range, and it is by no means impossible that it breeds there regularly. The nest is said to be placed usually in an evergreen tree, quite close to the ground, and to be made of twigs, grasses, strawberry vines and similar materials, lined with horse-hair, rootlets, etc.

The eggs are dull white, marked with lilac and reddish brown, and average .70 by .52 inches.

The single point of economic interest which we recall, in connection with this species, is the fact that, in company with the Tennessee Warbler and perhaps a few other species, it has been known to puncture ripe grapes and suck their juices. Were the birds numerous and the habit general some damage might be done, but under the circumstances no fruit-grower will be likely to complain.

TECHNICAL DESCRIPTION.

Adult male in spring: Entire top of head black or brownish-black; back olive-green, slightly streaked or spotted with black; rump and upper tail-coverts yellow; a yellow line over the eye, a black streak through the eye, a chestnut patch below and behind the eye; throat and upper parts generally rich yellow, thickly streaked with clear black,

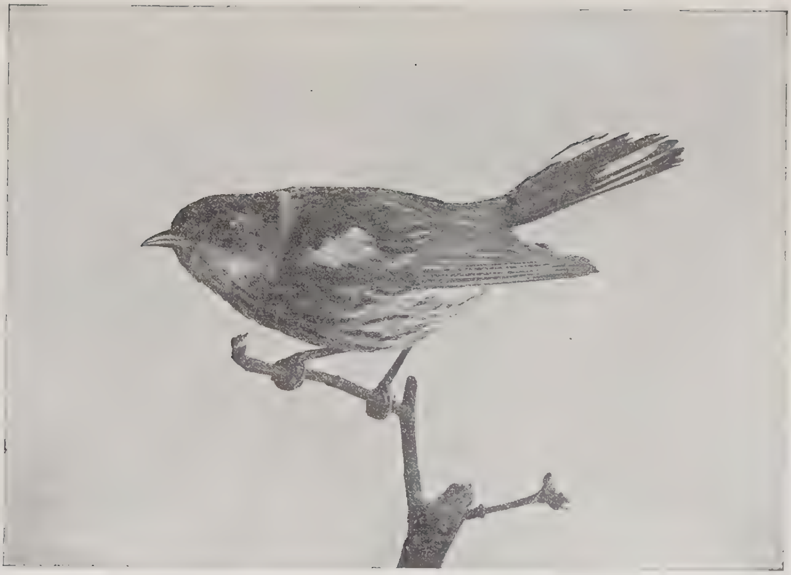

Plate LVIII. Cape May Warbler. Adult Male.
From Bird Lore. Courtesy of Frank M. Chapman.

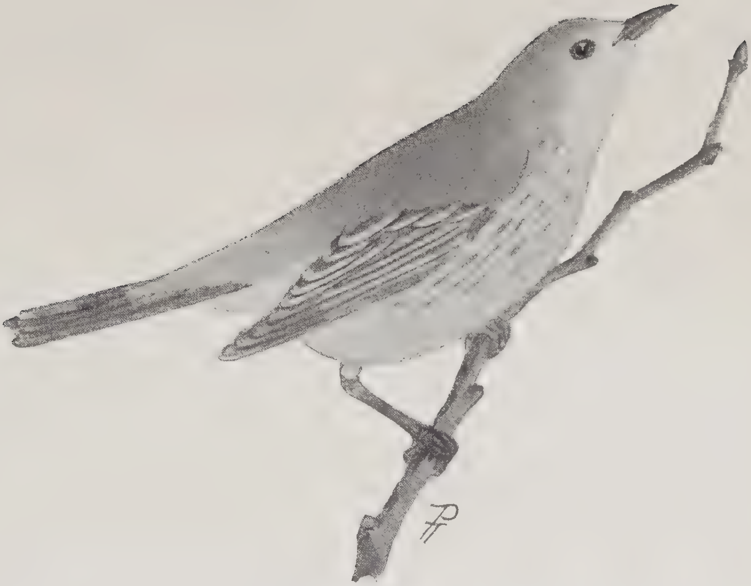

Plate LIX. Yellow Warbler.
From an original drawing by P. A. Taverner.

but with few streaks on the chin and none on the sides of the neck where the yellow forms a broad collar almost encircling the neck; the middle of the belly and under tail-coverts are usually white, as is also the lining of the wings; wings brownish-black, glossed with green, and with a conspicuous white patch on the greater and middle coverts; tail-feathers black, the outer three pairs with large white spots on the inner web, the tips black. Female similar, but lacks the chestnut patch on the ear-coverts, and much less brightly colored otherwise; may usually be known, however, by the numerous dark streaks below, coupled with the yellow upper tail-coverts. Young birds of either sex in the autumn are usually confused with the young of other species and only the experienced student can separate them.

Length 4.70 to 5.65 inches; wing 2.85; tail 2.15. Female rather smaller than male.

271. Yellow Warbler. Dendroica æstiva æstiva (*Gmel.*). (652)

Synonyms: Summer Warbler, Golden Warbler, Summer Yellowbird, Yellowbird, Blossom-eater, Wild Canary (incorrect).—Motacilla æstiva, Gmelin, 1789.—Motacilla canadensis, Bodd., 1783.—Sylvia æstiva, Vieill., 1807.—Sylvicola æstiva, Sw. and Rich., 1831.—Dendroica æstiva, Baird, 1858, and many others.—Dendrœca æstiva, Sclat., 1859, and many subsequent writers.—Sylvia citrinella, Wils., 1810.—Sylvia childrenii, Aud., 1831.

Plate LIX.

The yellowest of all our warblers, except perhaps the Prothonotary, and the only one whose tail is mostly yellow; neither wings nor tail show any white markings. The female has the under parts clear yellow; in the male they are yellow, streaked with reddish brown or chestnut.

Distribution.—North America at large, except southwestern part, south in winter to Central America and northern south America. Breeds nearly throughout its North American range.

This beautiful little bird is probably the best known of all our warblers, and during spring and summer is universally distributed, being apparently just as abundant along the south shore of Lake Superior as in the southern parts of the state. It arrives from the south about the first of May in the southern counties and from ten to fourteen days later in the Upper Peninsula. It is very uniform in its time of arrival, the extremes observed by Mr. Swales at Detroit being April 25, 1899 and May 3, 1890. Up to the last week in July Yellow Warblers are seen commonly, but about that time they stop singing and mostly disappear. Doubtless a large part of them at once move southward, but stragglers remain until the first of September or even later, and one was killed on Spectacle Reef Light, Lake Huron, September 16, 1888.

This is one of our very familiar warblers, frequenting hedgerows, orchards, gardens and the shrubbery in city parks, as well as the willow thickets along the streams and the depths of the most lonesome swamps. At the time of its arrival many of the willows are in bloom and the fact that it is so frequently seen gathering food among their blossoms has given it the name "Blossom-eater," according to Dr. Gibbs. As a matter of fact the bird does not seem to eat any part of the willow blossoms, or for that matter any other flowers, but is undoubtedly catching the insects attracted by the nectar and pollen.

Its song is constant and emphatic, and as Chapman says, "though simple, it has a pleasing, happy ring." He describes it as "wee-che, chee-chee, cher-wee."

The nest is built very soon after arrival, often by the 10th or 12th of May, almost invariably by the first of June in the Lower Peninsula. It is commonly placed in some low bush or shrub, often within two or three feet of the ground, rarely ten or fifteen feet up in a fruit tree or shade tree. It almost always consists largely of light-colored flaxen or hempen materials, gathered from various weed-stalks, and is very bulky, with thick walls and a deep hollow. It is lined with similar but finer fibrous materials, to which is added a large amount of plant-down which is often compactly felted so that the interior is very smooth and warm. The eggs are four or five, bluish or greenish white, rather coarsely spotted with lilac, brown and black. They average .66 by .48 inches.

The Yellow Warbler is constantly victimized by the Cowbird, and in places where this parasite is abundant many deserted nests are found containing from one to four eggs of the Cowbird, with or without some of the warbler. This frequent desertion of the nest and the building of a new one apparently explains the late date at which fresh eggs are often found, the first to the middle of June; we have no conclusive evidence that the bird ever rears two broods. As is well known, this warbler not infrequently covers a Cowbird's egg with a new layer of material in the bottom of the nest, raising the rim of the nest correspondingly, and instances have been known where this has been done a second time, making a three-storied nest.

The food consists mainly of insects and spiders, although small fruits are taken sparingly; we have never heard a complaint of damage to garden fruits by this bird. Forbes has shown that, like most other birds, it makes use of the food which is most easily obtained, and in an orchard overrun with canker-worms he found that these larvæ formed two-thirds of the whole food of the Yellow Warbler; the other insects were mainly beetles, but there was 6 percent of spiders.

This bird is frequently confounded with the Goldfinch, which is also called Yellow-bird, but the two species have really little resemblance in song or habits. A comparison of the description of the Yellow Warbler with that of the Goldfinch will show how unlike the two birds really are, in spite of the fact that both show a large amount of yellow.

TECHNICAL DESCRIPTION.

Male in spring: Forehead, crown, and entire under parts clear canary-yellow; throat unspotted; breast and sides thickly streaked with reddish brown; back and upper tail-coverts greenish yellow; wing-feathers dusky, the tertials margined externally with yellow; tail-feathers brownish black on outer webs, the inner webs yellow. Female: Similar but forehead and crown greenish-yellow like the rest of the back, and the yellow under parts faintly or not at all streaked with brown; wings and tail as in the male; size but slightly less. Young birds are duller and browner, but may be recognized in any plumage by the yellow tail-markings as above.

Length 4.50 to 5 inches; wing 2.35 to 2.65; tail 1.80 to 2.10.

272. Black-throated Blue Warbler. Dendroica cærulescens cærulescens (*Gmel.*). (654)

Synonyms: Motacilla cærulescens, Gmelin, 1789.—Sylvia canadensis, Wils., Nutt., Aud. Sylvicola canadensis, Rich. Dendroica canadensis, Baird, 1858. –Sylvia pusilla, Wils., 1912.—Sylvia sphagnosa, Bonap., 1824.

The male has dark blue upper parts, clear black throat, breast and sides, and white belly. Several of the outer tail-feathers have white marks, and there is a very constant and characteristic white spot in the wing at the base of the primaries. The female has olive (sometimes glossed with blue) in place of the blue, and plain gray or pale buff in place of the black.

Distribution.—Eastern North America to the Plains, breeding from northern New England and northern New York northward to Labrador, and in the Alleghanies south to northern Georgia; West Indies and Guatemala in winter.

This dainty little warbler is one of our most abundant migrants and is a summer resident in larger or smaller numbers over by far the greater part of the state. While many doubtless pass far north of Michigan to nest, large numbers remain in the northern part of the Lower Peninsula and all over the Upper Peninsula, and probably a few pairs nest in favorable localities everywhere in the state, except possibly in the two or three southernmost tiers of counties. It arrives from the south with the great wave of warblers early in May, or occasionally during the last week in April, and continues to move along in a rather leisurely manner until the very last of the month. We have records of specimens killed on Spectacle Reef Light, Lake Huron, May 17, 19, 21, 22, 23, and 24, in as many different years, while out of just a dozen fall records all but three are during the last week of September or the first week in October, the exceptions being September 17, 1893, August 19, 1889, and September 1, 1894. The latest lighthouse records are October 1, 1890 and October 3, 1893, on Spectacle Reef Light, and October 10 on Waugoshance Light, near the western entrance of the Straits of Mackinac.

Nesting records are somewhat numerous. C. W. Gunn took a set of four fresh eggs in Ottawa county June 6, 1878, from a nest in a raspberry bush in the edge of a pinery, the nest placed only about two feet from the ground. The late R. B. Westnedge, of Kalamazoo, took a nest in Kalamazoo county May 29, 1891, containing four fresh eggs. This nest was but eleven inches from the ground, in a small maple bush. Dr. Gibbs has also found the bird in Kalamazoo county during summer. J. Claire Wood states that in June 1899 his brother found this warbler nesting near Detroit, Wayne county, and Dr. R. H. Wolcott found it at Charlevoix, Charlevoix county, where he took the nest and young. The writer also took a nest and three eggs near Petoskey, Emmet county, July 18, 1904. In Mackinac county, August 2 and 3, 1901, several pairs were found by the writer which evidently were feeding young, although neither these nor the nests were located, and Mr. Norman A. Wood and other members of the University of Michigan party, had a similar experience in the Porcupine Mountains, Ontonagon county, where a pair, evidently nesting, were found July 17, 1904, and young unable to fly were taken July 20. Miss Harriet H. Wright reports the finding of two nests in Iosco county, the last week in June, 1907. The nests were in small bushes at the edge of a swamp and both contained eggs.

The nest is very compactly and prettily built of leaves, fibrous bark of various kinds, and roots, and often ornamented externally with caterpillars' silk, birch bark and similar materials, like the nests of many vireos. The nest above mentioned, found near Petoskey, was built very largely of fibrous bark of the hemlock, mixed with fine twigs of the same tree, and lined almost entirely with threadlike black roots. The outside was largely covered with strips and rolls of the white outer bark of the birch, and the nest was placed in a small hemlock only about two feet from the ground and directly against the white trunk of a large birch, so that it was by no means conspicuous.

The eggs are three or four in number, white or creamy white, spotted mainly with brown and lavender, with a few dots of very dark brown and black. They average .68 by .49 inches. The late date at which eggs are found, and the fact that many observers have found the birds accompanied by scarcely fledged young in August, makes it fairly certain that this warbler often rears two broods.

The song is quite characteristic but difficult to describe. It consists usually of four or five rather wheezy or nasal notes, given in quick succession and with a rising inflection, and suggesting in quality the song of the Black-throated Green Warbler, although perfectly distinct. At all times the bird seems fond of evergreen woods, yet during migrations it is found as often in the hardwoods as elsewhere, and during the nesting season is perhaps most abundant in mixed woods where there is a sprinkling of evergreens.

The food consists mainly of insects, and we know of nothing in its food habits which merits special notice; it certainly is not injurious in any way and is doubtless one of those species which is always useful in keeping down the numbers of noxious insects.

TECHNICAL DESCRIPTION.

Adult male in spring: Above clear grayish-blue, bluest on forehead and crown; chin, throat, and sides of head and neck, velvet black, this color extending in a stripe along each side of the breast; middle of breast, belly and under tail-coverts, pure white; wings black, glossed with blue, the coverts without any bars, but a conspicuous white patch at the base of the primaries; tail-feathers black, the outer three pairs with large white patches on the inner webs near the end; bill black. Female entirely different: Upper parts olive-green, usually with a blue tinge on the crown and upper tail-coverts; chin, throat, and breast soiled or yellowish-white, becoming buffy on the belly and under tail-coverts; a conspicuous whitish line from the bill over and behind the eye; white spot at base of primaries small, but always visible; tail markings of the same size and shape as in the males, but dull ashy instead of white. In any plumage the white spot at base of primaries is diagnostic. Length 4.70 to 5.50 inches; wing 2.50 to 2.65; tail 2.05 to 2.25. Female rather smaller.

273. Myrtle Warbler. Dendroica coronata (*Linn.*). (655).

Synonyms: Yellow-rumped Warbler, Golden-crowned Warbler, Yellow-rump.—Motacilla coronata, Linn., 1766.—Sylvia coronata, Lath., 1790, Vieill., Wils., Nutt., Bonap., Aud.—Dendroica coronata or Dendrœca coronata of most later authors.

*Plate LX.**

Streaked with black and white below, with black and bluish-gray above; crown and rump each with a bright yellow patch, and usually a yellow spot on each side of the breast. Two white wing-bars; the outer tail-feathers with white spots.

Distribution.—Eastern North America, chiefly, straggling more or less commonly westward to the Pacific; breeds from the northern United States northward, and winters from southern New England and the Ohio valley southward to the West Indies and through Mexico to Panama.

The Myrtle or Yellow-rump is a common migrant throughout the state and an irregular and somewhat scarce summer resident in its northern

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*This plate, taken from North American Fauna, No. 16, in reality represents Audubon's Warbler, a Rocky Mountain species which very closely resembles our Myrtle Warbler, the principal difference being that the latter has the throat white instead of yellow. Since this does not show in an uncolored plate, and the cut is otherwise an excellent likeness of the Myrtle Warbler we have taken the liberty of using it as such.

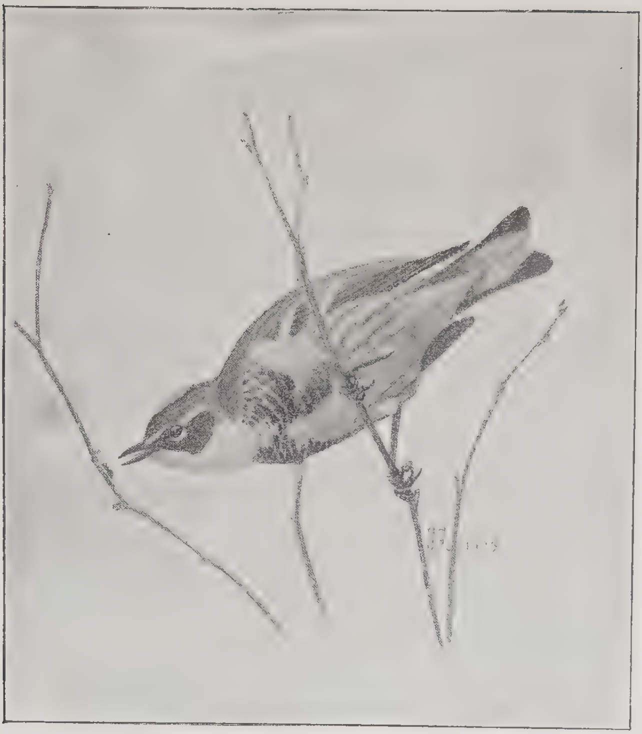

Plate LX. Myrtle Warbler. Adult Male.
From North American Fauna, No. 16.
Courtesy of Biological Survey, U. S. Department of Agriculture.

parts. Unlike many of our warblers it is seen during migration in flocks of considerable size, often frequenting open grounds, even stubble fields and pastures, although it prefers bushy fields and the margins of woods. It is one of the earlier warblers to arrive from the south, entering the state as early as April 17, 1886 (Petersburg, Trombley), although ordinarily it is somwehat later, reaching the southern counties about the last week in April and arriving in the Upper Peninsula the first or second week in May (Big Sable Light, Lake Superior, May 9, 1891). There are numerous records of the Yellow-rump killed on Spectacle Reef Light, Lake Huron, from May 7 to May 22, and again from September 25 to October 10. Doubtless birds reared in the state move southward earlier than this, since migrants appear in the southern part of the state late in August, sometimes even by the middle of the month. It is one of the latest of our warblers to depart, usually remaining through most of October and occasionally into November. Mr. Swales records several seen near Detroit November 25, 1893.

In central and northern Indiana Myrtle Warblers are known to winter irregularly in some numbers according to Butler, who says: "Their winter range does not seem to be limited by the degree of cold, for some of our colder winters, when the thermometer registers below zero, they remain, and warmer winters are not observed. * * * Late in March and early in April they frequent the thickets fringing our streams. * * * They do not really occur outside their winter home until a number of other warblers have arrived in southern Indiana, but every year they occur about the same time and they usually move forward and possess the land at once; two or at most a few days suffice to cover the state" (Birds of Indiana, 1897, p. 1050).

In their summer home in northern Michigan they seem to prefer the vicinity of evergreens, and are oftenest seen among dwarf spruces, balsams and tamaracks, about the edges of swamps or along the margins of streams and lakes. In such situations they nest, building a rather compact structure of twigs, grasses, etc., lined with finer materials of the same kind, and perhaps a few feathers, the nest being placed in an evergreen often only three or four feet from the ground, although sometimes at an elevation of ten or twelve feet. Max M. Peet gives his experience with this bird on Isle Royale, Lake Superior, in 1905, as follows: "Fairly common in the balsam and spruce forest, but was often found feeding along the rocky shores. A nest containing four well feathered young was found July 7. It was in a Jack pine at the end of a horizontal limb about ten feet from the ground. It was composed of balsam twigs and needles and lined with feathers of the Sharp-tailed Grouse and Canada Jay. July 27, 1905, another nest was found on an island at the north side of Rock Harbor. It was placed on a horizontal limb of a white spruce about six feet from the ground. It was composed of small twigs and grasses, lined with feathers and contained three young about three days old. Four nests were found on two small islands near the end of Rock Harbor, one of which contained small young, another nearly full-fledged young July 21, and the other two were empty. On July 28 a young Myrtle Warbler just out of the nest was found on a small island" (Adams' Rep., Mich. Geol. Surv., 1908, pp. 374-375).

The eggs are four or five, cream-colored or white, with spots of brown and purplish, and perhaps a few black specks. They average .70 by .53 inches.

Dr. R. H. Wolcott found it resident, and apparently breeding, at Charlevoix, and the writer found several pairs, evidently nesting, on Beave-Island, Lake Michigan, in the summer of 1904. The University expedition to Northern Michigan found a few specimens in the Porcupine Mountains during July, and adults accompanied by young were seen there on July 16, 1904. Mr. T. B. Wyman states that it is a summer resident and breeds at Negaunee, Marquette county, and Mr. S. E. White found it a not uncommon summer resident on Mackinac Island in 1890 and 1891. There is little doubt that it nests regularly, but in small numbers, over a considerable area in Crawford, Otsego and Oscoda counties, and probably in other counties in the northeastern part of the Lower Peninsula. So far as we can learn, however, no one has ever taken the eggs in the state. In the light of our present knowledge we should say that the breeding area lies entirely north of the Saginaw-Grand Valley, yet it is very likely that isolated pairs may nest in favorable situations much farther south.

The food of the bird in many respects resembles that of the other warblers, but this species appears to take a much larger proportion of vegetable matter, at least during migration. It gets its name of Myrtle Warbler from its fondness for the berries of the wax-myrtle or bay-berry (*Myrica cerifera*), on which it feeds greedily during its migration along the Atlantic Coast. It is also one of the birds which eats freely the berries of the poison sumac and poison ivy (*Rhus venenata* and *R. toxicodendron*), and by so doing distributes these pests more widely. It also eats numerous other berries and seeds, probably taking almost any small fruits which come in its way.

Its song is in no way remarkable, and is not easily described so as to be recognized. It is a rather pleasant warble, consisting of a repetition of a few syllables, which Seton Thompson describes as "pheo pheo pheo, phew-phee, phew-phee, the first part being uttered very rapidly and the last with more deliberation" (Birds of Manitoba, p. 618).

TECHNICAL DESCRIPTION.

Adult male: Always recognizable by its four yellow patches, namely, one on the crown, one on the rump, one on each side of the breast; in addition, the upper parts are bluish-ash, streaked with black; the throat and middle of belly white and unstreaked; breast and sides heavily streaked and spotted with black; two white wing-bars; two or three outer pairs of tail-feathers spotted with white on inner webs near the end. The female is similar, but browner above and less extensively streaked with black below; the four yellow patches are always to be found. In fall and winter the yellow and black are more or less concealed by the broad white or ashy edges and tips of the feathers, and in young of the year little or no yellow may be visible.

Length 5 to 6 inches; wing 2.75 to 2.85; tail 2.20 to 2.30; female somewhat smaller.

274. Magnolia Warbler. Dendroica magnolia (*Wilson*). (657)

Synonyms: Black and Yellow Warbler, Spotted Warbler.—Sylvia magnolia, Wils., 1811.—Motacilla maculosa, Gmel., 1788.—Sylvia maculosa, Vieill, Bonap., Aud., Nutt.—Dendroica maculosa and Dendrœca maculosa of most recent authors.

Figure 136.

Known by its rich yellow rump and under parts, the latter thickly streaked with black. Especially characteristic is the dark tail with a broad zone of pure white across its middle, each feather (except the middle pair) being dark at base and tip with middle third white.

Distribution.—Eastern North America, west to the base of the Rocky Mountains, and casually to British Columbia, breeding from northern New England, northern New York, and northern Michigan, to Hudson Bay Territory and southward in the Alleghanies to Pennsylvania. In winter, Bahamas, Cuba, and south through eastern Mexico to Panama.

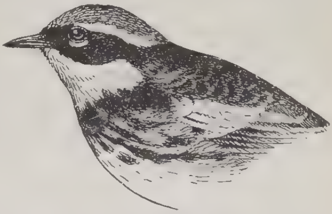

Fig. 136. Magnolia Warbler. From Hoffmann's Guide. Houghton, Mifflin & Co.

This exquisite little bird comes to us from the south about the first week in May and passes slowly northward, some lingering in middle Michigan until the very last of the month. We have no record of its arrival in the state before the first of May and it rarely appears as early as the second or third of the month. The average time of arrival at Ann Arbor for twenty-five years is given by N. A. Wood as May 9, and it reaches Lansing a few days later, and the northern counties of the state between the 20th and 30th of the month. Returning in autumn it is most abundant about the middle of September, but numbers begin to move southward late in August and some linger, even in the middle counties, until about the first of October. We have records of its striking Michigan lighthouses on thirty-two different dates, and it has figured regularly in the reports from Spectacle Reef Light, Lake Huron. By far the greater number of these dates fall in the last half of September, the latest being October 2, 1893.

The Magnolia or Black and Yellow Warbler is always an abundant migrant, and is a somewhat scarce summer resident over the northern half of the state. Apparently very few nests have been found, yet the birds have been noted here and there by a dozen different observers during the nesting season, and several observers speak of it as nesting regularly and abundantly in their vicinity. This is the report of O. B. Warren in Marquette county, and Ed Van Winkle in Delta county, while the writer found it fairly common about Little Traverse Bay during the summer of 1904, and also on the Beaver Islands the same season. Mr. S. E. White found it a characteristic summer bird of Mackinac Island, and Dr. Wolcott found it in summer at Charlevoix, where it doubtless breeds. It probably is most abundant along the Lake Superior shore, from Marquette to the Sault, and the writer found it in the summer of 1903, at Marquette, Munising, Grand Marais, and near Sault Ste. Marie. In July 1906 Mr. E. A. Doolittle found several nests of young on Grand Island, Munising Harbor. We have no nesting records for the southern half of the state, and if it ever spends the summer south of the Saginaw-Grand Valley it must be rarely. About the head waters of the Manistee, Muskegon and Au Sable rivers, in Roscommon, Crawford, Oscoda and Otsego counties, the bird has been observed frequently in summer and must nest regularly, but apparently not in large numbers.

The nest is placed usually in an evergreen bush or tree at no great height from the ground, in most cases less than ten feet, but occasionally somewhat higher, and more rarely still on a horizontal branch at a considerable height. Nests are frequently found only two or three feet from the ground in spruces and hemlocks and usually well hidden in the thick foliage. The nest is built of grasses, twigs, and various plant fibres and strips of bark, and is usually lined with fine roots which are almost always black.

The eggs are three or four, white, spotted with brown and lilac, and average .63 by .48 inches.

No two writers agree as to the song of this bird. Evidently there is much individual variation and if some of our writers are not mistaken in their identification this warbler must have a greater variety of notes than any other of the genus. Mr. White states that on Mackinac Island he "detected seven distinct songs, no one of which was even a variation of the other." Brewster, writing of northern New England, speaks of its commonest song as resembling the words "she knew she was right; yes, she knew she was right." Nehrling says: "The song is a simple but pleasing chant, vividly recalling the lay of the Myrtle Bird and at other times that of the Yellow Warbler." According to Mr. Minot, "unfortunately, of all these numerous songs not one is distinctively characteristic of this warbler."

The food does not seem to differ materially from that of the other wood warblers. During migration (as well as at other times) it feeds extensively upon plant-lice and is a common bird in orchards and gardens, but during the nesting season it shows a decided preference for forests, and especially the edges of evergreen woods, and its consumption of insects at this time has therefore little direct value for the agriculturist.

TECHNICAL DESCRIPTION.

Adult male: Entire top of head bluish-ash; back and upper tail-coverts velvet black; rump yellow; chin and throat rich yellow, unspotted; breast and belly yellow, heavily spotted and streaked with velvet black in front and along sides; middle of belly unspotted, the yellow paler behind, becoming pure white on under tail-coverts; lores, space below eye, and cheeks black; lower eyelid and short line above and behind eye pure white; two broad white wing-bars, commonly fused into a single large patch; wing and tail-feathers brownish-black, the middle pair of tail feathers unspotted, each of the others with a long white spot on the inner vane near the middle, so that the tail when spread looks like a white tail with a broad black terminal band; bill and feet black. Adult female: Similar, but duller and smaller, the back only spotted with black, the ground color olive-green to brownish ash; black streaks below smaller and shorter; the two wing-bars separate, yellow rump and tail-feathers the same as in male.

Length of male 4.35 to 5 inches; wing 2.25 to 2.45; tail 1.85 to 2.05.

275. Cerulean Warbler. Dendroica cerulea (*Wilson*). (658)

Synonyms: Blue Warbler, Azure Warbler.—Sylvia cerulea, Wils., 1810.—Sylvicola cærulea, Rich., Aud.—Dendroica cærulea or Dendrœca cerulea of most recent authors. —Sylvia rara, Wils., 1911.—Sylvia azurea, Steph., Nutt., Aud., 1831.

Mainly clear light blue with some blackish streaks above; the under parts white, with dusky blue streaks; the wings with two white bars. This is our only warbler which shows a decided light blue color.

Distribution.—Eastern United States and southern Ontario, west to the Plains. Rare or casual east of central New York and the Alleghanies. In winter, south to Cuba, southeastern Mexico, Central America, Colombia, Peru and Bolivia. Breeds from West Virginia, Tennessee, Missouri, and Kansas northward to Minnesota.

The Cerulean Warbler is a regular and rather abundant visitor to the southern, and especially the southeastern, part of the state and occurs sparingly as far north as Port Huron and Grand Rapids. Mr. O. B. Warren records it as a rare migrant at Palmer, Marquette county, but this is the only record for the Upper Peninsula, and among the thousands of warblers killed on Michigan lighthouses, this species has never been found. Even in the neighborhood of Lansing it is never common, having been observed of late years only half a dozen times, and then singly. Dr. Atkins first took it at Locke, Ingham county, May 16, 1876 and again in June 1881. He called it an irregular migrant and scarce (Dr. Morris Gibbs). On the other hand it was formerly very abundant at Petersburg, Monroe county, according to Trombley, although it has now almost entirely disappeared.

It is an abundant summer resident, however, in Wayne county and St. Clair county, according to Swales, Taverner, Davidson, and J. Claire Wood, and its nest has been repeatedly found in that neighborhood, as well as in Washtenaw county. James B. Purdy records it as not uncommon at Plymouth, Wayne county, but states that he has found the nest but once. L. Whitney Watkins finds it a common summer resident near Manchester, Washtenaw county, and across the line in Jackson county; Mr. Edward Arnold states that its nest has been found near Battle Creek, and Dr. Gibbs says there are several records for Kalamazoo. It is, however, much less common on the western side of the state and grows rapidly scarce as we pass northward.

It is an inhabitant of heavy timber and appears to prefer bottom lands, where it confines itself almost entirely to the upper branches of the tall trees. When migrating it frequently descends to the lower growth, and may sometimes resort to the ground for food, and of course for nesting material, but it certainly prefers the higher parts of the forest. It arrives from the south at about the same time as the last species, Mr. Norman A. Wood giving the average date for twenty-five years at Ann Arbor as May 12, and the earliest record there as April 30, 1888.

The nest is built invariably at a considerable height, in the great majority of cases about forty feet, and often as high as eighty feet above the ground. It is small, and compactly built of various fibrous materials, and is sometimes saddled on a horizontal limb, but more often in an upright or oblique fork. The eggs are usually four and are bluish or greenish-white, spotted with brown and lilac, and average .69 by .53 inches. Largely on account of the habits of the bird the nest was imperfectly known for a long time, and up to the summer of 1878, Audubon's description of a nest found near Niagara Falls was practically the only account known. In June 1878, a collector at East Penfield, New York, brought the writer a nest of four eggs which was found in the fork of a small ash tree about twenty-five feet from the ground and was built of fine grasses bound firmly together with spiders' silk and lined with strips of bark and fine grasses. This nest is now in the Museum of Comparative Zoology at Cambridge, Massachusetts. The same spring a nest was found at Mt. Carmel, Ill., which was similar, but more bulky and more firmly built. During recent years several Michigan collectors have found numbers of the nests, especially in Wayne county, where W. L. Davidson took a nest and four eggs, near Detroit, June 6, 1897, and Mr. J. Claire Wood found many nests in 1904 and 1905, most of them early in June. Two nests taken June 20, 1909, contained eggs far advanced in incubation. At Grand Ledge, Eaton county, adults with nearly full-fledged young were found July 13 and 14, 1907, by E. R. Kalmbach and H. A. Moorman.

According to McIlwraith the Cerulean Warbler is a regular summer resident in southern Ontario, but somewhat local in its distribution. "Its song is almost identical with that of the Parula Warbler, but in the latter species it rises to a slightly higher key at the close, while the Cerulean's ditty is uniform throughout." Langille says: "Its song may be imitated by the syllables 'pheet, pheet, pheet, pheet, ridi, idi, e-e-e-e-e-e-e;' beginning with several soft warbling notes and ending in a rather prolonged but quite musical squeak."

Its food does not seem to differ materially from that of other arboreal warblers; it is probably beneficial, certainly not injurious to the agriculturist.

TECHNICAL DESCRIPTION.

Adult male: Above bright grayish-blue, often clear blue on forehead and crown, more or less streaked with black on the back; chin, throat, and sides of neck pure white, as is also the middle of the breast and belly; an imperfect band of bluish or black streaks across the upper breast, and sides streaked with the same; wings brownish-black, the tertials often edged with white, and two white bars across the coverts; tail-feathers black, margined externally with blue, all the feathers except the central pair with rounded white patches on the inner webs. Female showing very little blue; the upper parts olive-green, merely glossed with blue; the lower parts soiled whitish, often yellowish or even buffy. Length 4 to 5 inches; wing 2.40 to 2.70; tail 1.70 to 1.90; female decidedly smaller.

276. Chestnut-sided Warbler. Dendroica pensylvanica (*Linn.*). (659)

Synonyms: Yellow-crowned Warbler, Quebec Warbler.—Motacilla pensylvanica, Linn., 1766.—Sylvia pensylvanica, Wils., 1810.—Sylvia icterocephala, Lath., 1790.—Dendroica (or Dendrœca) pennsylvanica of most recent authors.

Figure 137.

The whole top of head is yellow, the under parts clear white, except for a broad stripe of chestnut which runs along each side from neck to tail.

Distribution.—Eastern United States and Southern Ontario, west to Manitoba and the Plains, breeding southward to central Illinois and northern New Jersey, and in the Appalachian highlands probably to northern Georgia. Visits the Bahamas, eastern Mexico, Central America and Panama in winter.

An abundant migrant throughout the entire state, and in all but the southern half of the Lower Peninsula an abundant summer resident. In the latter region it nests regularly, but less commonly, so that it is reported as not breeding by several observers in the southern counties. Nevertheless a few doubtless breed in every county in the state, and in the higher parts of the Lower Peninsula and in the Upper Peninsula it is one of the most abundant warblers during the summer, frequenting open hardwood and second growth regions and showing a decided preference for shrubby fields and the bushy margins of forests. It is seldom found in the evergreen swamps or the dense woods, but on the contrary is often found in thickets along the roadsides and in briar patches and tangles along the borders of the smaller swamps.

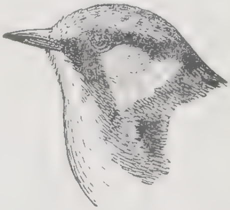

Fig. 137. Chestnut-sided Warbler. From Hoffmann's Guide. Houghton, Mifflin & Co.

It arrives from the south from about the first of May in the southern counties to the 15th or 20th of the month in the northern parts of the state. Mr. Norman A. Wood gives the average date for twenty-five years at Ann Arbor as May 11, but it has been seen there as early as April

7, 1896, and in 1888 it did not arrive until May 20. At Petersburg Mr. Trombley noted the first arrival on May 28, 1889 and April 30, 1894, while other dates range from May 1, 1887 to May 14, 1890. At Palmer, Marquette county, Mr. O. B. Warren recorded it on May 17, 1894 and May 4, 1895, while specimens were killed on Spectacle Reef Light, Lake Huron, May 15 and 19, 1891, and May 28, 1892.

The nest is built between the middle of May and first of June, and is invariably placed in a bush or thicket, seldom more than three or four feet from the ground. It is composed of various soft vegetable fibres and lined with rootlets and hairs. The eggs are three or four, white, with brown and lilac specks about the larger end and sometimes a few black dots. They average .65 by .49 inches.

According to McIlwraith, this species rears two broods in a season, but we have not been able to verify this statement for Michigan. The bird is regularly imposed upon by the Cowbird and undoubtedly is often obliged to make several attempts before it succeeds in rearing a brood. It seems likely therefore that these later nests may have been mistaken for second broods. Certainly the majority of these warblers do not rear second broods, and the species is far from common in the late summer, although it is occasionally a rather abundant migrant during the last half of August and the first half of September. Probably all leave the state before the first of October.

In regard to its song Seton Thompson says: "It is somewhat like that of the Orange-crowned Warbler. I can recall it to mind by the aid of the syllables chip-e, chip-e, chip-e, chip-e, wai-chip, the single emphatic syllable near the end being the most tangible difference" (Birds of Manitoba, p. 619).

Apparently its food does not differ widely from that of the other members of the genus. In Forbes' historic study of the cankerworm infested orchard, two-thirds of the food of this species was found to consist of cankerworms, in addition to which there was 10 percent of caterpillars, a few ants, 5 percent of plant-lice and 11 percent of beetles. Like all our warblers this species is a hearty feeder on plant-lice during its migrations.

TECHNICAL DESCRIPTION.

Adult male: Upper parts mainly black, streaked with white or greenish-white, the entire top of head yellow of varying intensity; lores and half of cheek black, remainder of cheek and part of the side of neck white; chin, throat, breast, belly and under tail-coverts, pure white; a conspicuous stripe of rich chestnut running along each side from lower neck to flanks; two white or yellowish-white wing-bars; three outer pairs of tail-feathers largely white on inner webs. Female similar, but the crown greenish-yellow or even clear green, and the back olive-green, streaked with black; less black on the cheeks, and the chestnut stripes reduced to spots and streaks, or sometimes almost wanting. Length 4.60 to 5.25 inches; wing 2.40 to 2.65; tail 1.95 to 2.10; female slightly smaller.

277. Bay-breasted Warbler. Dendroica castanea (*Wilson*). (660)

Synonyms: Bay-breast.—Sylvia castanea, Wilson, 1810.—Dendroica (or Dendrœca) castanea of most authors.—Sylvia autumnalis, Wils., Bonap., Aud., and others (for specimens in fall plumage).

Figure 138.

Distinguished by the dark chestnut or "bay" crown and the throat and sides of the breast a lighter shade of the same color. Perhaps the most conspicuous field-mark, however, is a large patch of cream white on each side of the neck.

Distribution.—Eastern North America, north to Hudson Bay. Breeds from northern New England and northern Michigan northward; in winter, south through eastern Mexico (rare) and Guatemala to Colombia.

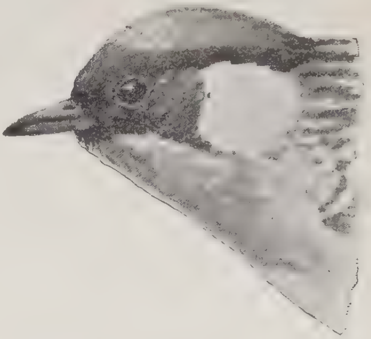

Fig. 138. Bay-breasted Warbler. From Coues' Key, 5th ed., 1903. Dana Estes & Co.

The Bay-breasted Warbler is one of the later migrants, seldom arriving from the south before the second week in May, even in the southern counties, and not infrequently delaying its appearance until the 15th or 20th of the month. At Ann Arbor Mr. N. A. Wood gives the average date of arrival for twenty-five years as May 13, and the records from the various lighthouses indicate that the principal movement occurs between the 15th and 30th of the month. We have records from Spectacle Reef Light, Lake Huron, on May 11, 1888, May 15 and 19, 1891, May 17, 1885, May 19, 1887, May 22, 1890 and again in 1893, and May 23, 1897. The southward movement begins early in September and is mainly completed during the month, although specimens are frequently taken well into October.

In Michigan, as in New England and Wisconsin, the Bay-breast is much more abundant in some seasons than in others. Occasionally it is a common spring migrant, and then for several years it may hardly be seen at all. In our experience the adults are decidedly scarce during the fall migration, but the young are fairly abundant. The birds during migration frequent forests, groves and orchards, with apparently little preference for any particular kind of growth, but it is said to prefer the neighborhood of evergreens in the regions where it nests.

Much uncertainty exists with regard to its presence in Michigan in summer. The distribution given above by the A. O. U. list includes Michigan in its breeding range, and Professor A. J. Cook, in his 1893 list, speaks of it as breeding in the northern part of the state and cites Davie and Nehrling as authorities. Mr. S. E. White states that it is a rare summer resident on Mackinac Island, where he found it also an abundant migrant; but he did not find it nesting. After thorough search of the literature, and careful inquiries in every available quarter, we have failed to find any authentic record of its nesting in Michigan, and while it is by no means impossible that it may do so, we believe that it yet remains to be proved to be a summer resident of the state. It is well known to nest in some of the northernmost parts of the United States, and was found by Mr. Brewster to be a fairly common nester in the neighborhood of the Umbagog Lakes in Maine. He states that there the nest was usually placed on a horizontal branch of hemlock or spruce from fifteen to twenty feet from the ground, the nest being large in comparison with the size of the bird. The materials of the nest were small tamarack twigs, mixed with a little tree moss, very neatly and smoothly lined with black fibrous rootlets, seed-stalks of ground-moss, a little rabbit fur, and some sphagnum moss. The eggs are usually four, bluish-white, more or less speckled with brown, and average .71 by .51 inches.

According to Dr. Gibbs the bird has a beautiful song, but we have found no detailed description of this and must confess that although familiar with the bird in migration for twenty-five years, we have never yet heard it utter more than a few disconnected notes, aside from the characteristic chip which so many of our warblers use at that season. See however, Thayer's description in Chapman's Warblers of North America, page 194.

The food of this species does not differ, so far as we know, from that of other members of the genus.

TECHNICAL DESCRIPTION.

Adult male: Forehead and entire region about the eye, black; top of head, chin, throat, sides of breast and flanks, rich chestnut; a large patch of creamy white on each side of neck, and middle of breast and belly same color, becoming more buffy on under tail-coverts; back, rump and upper tail-coverts, gray, streaked with black; two white wing-bars; two outer pairs of tail-feathers broadly spotted with white on inner webs near tips. Female similar, but crown never clear chestnut, usually streaked with olive, black and brown; under parts mainly buffy, with traces of chestnut on upper breast and sides; bill black. Young of the year are totally unlike the parents and no description will enable the beginner to identify them with certainty.

Length 5 to 6 inches; wing 2.75 to 3; tail 2.15 to 2.25; female slightly smaller.

278. Black-poll Warbler. Dendroica striata (*J. R. Forster*). (661)

Synonyms: Black-poll, Autumnal Warbler.—Muscicapa striata, Forst., 1772.—Sylvia and Sylvicola striata of the older writers, Dendroica and Dendrœca striata of the more recent.

Streaked black and white, the entire top of head deep black. Might be mistaken for the Black and White Warbler, but the latter has a white stripe through the middle of the crown.

Distribution.—Eastern North America, west to the Rocky Mountains, north to Greenland, the Barren Grounds, and Alaska, breeding from northern New England and the Catskills northward. South in winter to northern South America, but not recorded from Mexico or Central America.

This is another very late migrant, probably the latest of its genus. At Ann Arbor, during twenty-five years of observation, the earliest arrival noted by Mr. N. A. Wood was May 13 and the average May 15. We have records of specimens killed on Spectacle Reef Light, Lake Huron, on May 23, 1897, May 28, 1888 and 1892 and June 1, 1892, while there are two records from Big Sable Light, Lake Superior, May 19, 1887, and June 6, 1894. The spring records from several observers in the northern parts of the state give much earlier dates than these, some even in April, but these undoubtedly are based on errors in observations, in all probability the Black and White Warbler being mistaken for this species. In autumn the Black-poll begins to move southward in August and the movement continues all through September and until the middle of October, single individuals being taken in the latter part of this month in the southern part of the state.

As with the Bay-breast there is some uncertainty about the breeding area, and we have no unquestionable record of its nesting in Michigan. It does nest occasionally in northern New England and New York, but it is not known to nest in northern Wisconsin, and it is very doubtful if it ever nests in northern Michigan. Single birds have been recorded in summer from northern Wisconsin (Kumlien & Hollister), and Mr. S. E. White gives it as a rare summer resident on Mackinac Island. We are informed by Mr. G. A. Abbott of Chicago that a friend of his observed the Black-poll Warbler on Mackinac Island on about half a dozen occasions between June 28 and July 15, 1906, but that no nests were found.

The food consists mainly of insects and the bird eats immense numbers of span-worms and plant-lice at all times of year. In the fall they also eat some seeds and berries, but they are mainly insectivorous and are expert flycatchers, taking much of their food on the wing. Forbes found that two-thirds of the food of those taken in an orchard overrun with cankerworms consisted of those worms, while 19 percent consisted of beetles, 4 percent of ants, and 5 percent of gnats.

The usual nesting grounds of this species are the evergreen forests of the far north, where they frequent the edges of the coniferous swamps and place the nests usually on the horizontal branches of the thick evergreens at five to ten feet from the ground. The nest is similar to that of the Bay-breast just described, but perhaps contains more grass and weed stems. The eggs are four or five, white or buffy white, speckled with brown and lilac, occasionally with black specks. They average .72 by .53 inches.

The song of the Black-poll is not noteworthy. While migrating its common call sounds like "sit-sit-sit" or "seet-seet-seet," repeated rather rapidly, and the notes rising in regular gradation.

TECHNICAL DESCRIPTION.

Adult male: Entire top of head coal-black, sometimes with a few ashy streaks; rest of upper parts gray or olive-gray, streaked with black; sides of head and neck white or nearly so, separated from the white throat by a chain of black spots and streaks which begins on the chin and extends along either side to the flanks; breast and belly white, unspotted; two white wing-bars; two or three outer tail-feathers with rather small white patches on inner webs near tip; upper mandible black, lower mandible much lighter. Female similar, but without the black cap, the upper parts olive-gray streaked with black; under parts less sharply streaked than in male. Young of the year entirely unlike the adult; upper parts olive or olive-gray more or less streaked with dusky; under parts soiled or yellowish-white, with indistinct gray streaks; under tail-coverts white; wing and tail markings as in adult, but tertials margined with white, and inner primaries often tipped with the same.

Length 5 to 5.75 inches; wing 2.80 to 2.90; tail 2.05 to 2.25; female slightly smaller.

Note.—The young of this species in autumn is separable with difficulty from the Bay-breasted Warbler of the same age, but the present species always has white under tail-coverts while those of the Bay-breast are always distinctly yellowish or buffy.

279. Blackburnian Warbler. Dendroica fusca (*Mull.*). (662)

Synonyms: Hemlock Warbler, Torch-bird, Fire-brand.—Motacilla fusca, Müller, 1776.—Sylvia or Sylvicola blackburniæ, of the older ornithologists, Dendroica or Dendrœca blackburniæ, of the more recent writers.—Sylvia or Sylvicola parus of Bonaparte, Nuttall and Aubudon.

Mainly black and white, the throat and a spot on top of head, bright yellow, orange or flame-color. A large white patch on the wing and nearly all the tail-feathers white marked.

Distribution.—Eastern North America, west to eastern Kansas and Manitoba, breeding from the southern Alleghanies, Massachusetts, and Michigan, northward to Labrador. In winter, south to the Bahamas, eastern Mexico, Central America, Colombia, Ecuador, and Peru.

This perhaps is our most brilliant warbler, and although frequently seen during migration does not appear to be abundant anywhere. Occasionally two or three may be seen feeding lazily among the opening buds of chestnut, oak, and other forest trees, in company with numerous other warblers, but it is rarely seen in large numbers and sometimes an entire spring migration will pass without a glimpse of its flame-colored throat. In the spring of 1909, however, it was unusually abundant during migration, especially in the southeastern part of the state. Mr. J. Claire Wood found it common in Wayne county from May 16 to 23, and on the 16th counted 260 Blackburnians among hosts of other migrants (Auk, XXVIII, 1911, 23). The species appears to be a summer resident, in very small numbers, in most parts of the state, and at the north it unquestionably nests regularly in the hemlock forests and probably also in most large mixed forests of hardwoods and evergreens.

It arrives from the south from the 1st to the 15th of May, rarely in the last few days of April, usually during the second week in May. Mr. N. A. Wood gives the average date of arrival, for twenty-five years, at Ann Arbor as May 8. We have records of specimens killed on Spectacle Reef Lighthouse, Lake Huron, May 11, 1888, May 17 and May 21, 1885, May 19, 1893, May 22, 1890, May 23, 1897, and May 28, 1892. There is a single record of one killed on Big Sable Light, Lake Superior, June 6, 1894. After nesting it begins to move southward early in August and the movement continues, as shown by the records at lighthouses, all through September and the early part of October, a specimen being recorded from Spectacle Reef Light October 3, 1893 and others on September 24, 1892 and September 27, 1886. Unlike many of our warblers this species seems to be rather less abundant in fall than in spring, but the young are quite inconspicuous and doubtless many slip past without being recognized.

The Blackburnian Warbler has been found in the nesting season at various points in Michigan, but so far as we can learn the eggs have been taken but twice. Near Kalamazoo Mr. B. F. Syke found two nests, one, June 2, 1882, containing three eggs, placed thirty-five feet from the ground in a tamarack, the other, June 5, 1881, placed on a small upward-angling limb of a tamarack, four feet from the trunk and forty feet from the ground, and containing four eggs and one of the Cowbird. The outside of this nest consisted of tamarack twigs, held together with milkweed bark, and it was lined with horse hair, fine roots and woody fibres. Both nests were in tamarack swamps, but the usual location is said to be in hemlock trees, at considerable heights, and the nest is said to be quite bulky and to consist very largely of the down of the cattail. "The eggs are three to five, greenish-white or very pale bluish-green, speckled or spotted, chiefly on or round the larger end, with brown or reddish brown and lilac gray. They average .68 by .50 inches" (Ridgway). The latest note on the nesting of this species in Michigan comes from Alex. G. Ruthven, and forms part of the manuscript report of Ruthven and Gaige on the Brown Lake region of Dickinson county in the summer of 1909. It is as follows: "This species was first noted July 17 in the hardwood forest. On this date a small flock of males, eight in number, were observed feeding in the hemlocks. They were all in the brilliant breeding plumage, but none were heard singing. An hour later a nest of this species was located by seeing a female carry food to her young. The nest was about thirty feet from the ground in a small hemlock in the hemlock and beech forest. It was a loosely constructed affair made of small twigs and a few needles, and fastened insecurely to the branch six feet or more from the trunk. It contained three young birds with the feathers just beginning to appear on the wings."

Dr. Dunham found it in Kalkaska county in the nesting season and states that on June 22, 1899 he took a male near East Lake, Kalkaska county and saw about a dozen more in the evergreens. It is a not uncommon summer resident in Emmet county, where Widmann found it feeding grown young in the tree tops in July 1901. S. E. White found it a rather common summer resident among the evergreens on Mackinac Island, in 1890 and 1891, and Dr. Wolcott found it at Charlevoix in summer and was confident that it nested there. Mr. O. B. Warren thought it might possibly breed in Marquette county in 1898, and Mr. T. B. Wyman in 1905 was positive that it bred near Negaunee in the same county. It was found at various times in the late summer in the Porcupine Mountains, Ontonagon county, by the University of Michigan expedition, and a pair with two young were seen in the tops of the birches July 14, and one adult female was taken while feeding young not able to fly. These facts show that the Blackburnian Warbler certainly nests rather commonly throughout northern Michigan and occasionally in favorable localities throughout the southern half of the state.

So far as we are aware there is nothing peculiar about its food habits, but it consumes immense numbers of insects and probably is just as valuable to the agriculturist as many of its congeners.

TECHNICAL DESCRIPTION.

Adult male: Upper parts, from bill to tail, mainly clear black, middle of crown with a spot of pale orange; middle of back streaked with pure white; chin, throat, sides of neck, and line from bill over eye, rich orange; rest of under parts pale yellow, bleaching to white on the under tail-coverts, the sides and flanks streaked with black; lores, cheeks, and one or two spots on side of neck, black; two white wing-bars, often connected; most of the tail-feathers with white spots, the three outer pairs mainly white on their inner webs, merely black-tipped. Female similar, but smaller, the orange replaced with pale yellow or yellowish white, the black replaced mostly with brownish-gray; upper parts streaked with dusky; no pure white anywhere, except two narrow wing-bars and the characteristic tail markings.

Length of male 5 to 5.50 inches; wing 2.50 to 2.80; tail 1.90 to 2.10; female somewhat smaller.

280. Sycamore Warbler. Dendroica dominica albilora *Ridgw.* (663a)

Synonyms: White-crowned Yellow-throated Warbler, White-browed Warbler, White-cheeked Warbler.—Sylvia and Sylvicola pensilis, Aud.—Dendroica superciliosa, Baird (part).—D. d. albilora of most recent authors.

The rich yellow chin and throat, bordered by clear black at the sides and fading into white on breast and belly, is nearly distinctive. Add to this the white line over the eye, the black forehead, two white wing-bars, and the white-blotched outer tail-feathers, and there can be no mistake. Only the expert can separate it from the Yellow-throated Warbler, *Dendroica dominica*, but this does not occur in Michigan (see Appendix).

Distribution.—Mississippi Valley, west to the Plains, north to Lake Erie and southern Michigan, and east to Western North Carolina; in winter south to southern Mexico, Honduras, Guatemala and Nicaragua.

This beautiful but little known warbler appears to be a somewhat regular visitor to certain regions in the southern and southeastern parts of the state. It has been reported from the Raisin River valley in Monroe county, by Jerome Trombley, of Petersburg; from the neighborhood of Detroit by Walter C. Wood; from Ann Arbor and Ypsilanti, Washtenaw county, by A. B. Covert, Norman A. Wood, Robert H. Wolcott, and Dr. Van Fossen of Ypsilanti, and from Kalamazoo by Dr. Morris Gibbs and several of his friends. It undoubtedly breeds wherever it is found in Michigan, but, inhabiting as it does the upper branches of the tallest trees of the bottom lands, mainly sycamores, its nest is not easily found, and although the birds have been seen several times constructing nests (twice in Monroe county and once in Kalamazoo county), the eggs, so far as we can learn, have never yet been taken. Mr. Trombley reported the birds as common near Petersburg, Monroe county, in the Raisin River valley, in 1884, when they first appeared on April 20 and became common on April 30. The following year they were first noted on April 20 and again on the 29th and on May first. In 1886 two were seen April 17 and another April 18, and they became common April 25. The following year they were observed in about the same numbers and at about the same time, but in 1888, although observed April 20, 21 and 25, Mr. Trombley says they were not common. In 1890 he was sure that two or three pairs bred along the Raisin River near there, but during succeeding years they grew less abundant, until in 1897 he called them rare, and since that time but few have been seen. In 1905 Mr. Trombley told us personally that he had never taken the nest of this species, but that he once saw a pair building a nest and watched them for several days in succession, but the nest was on one of the highest branches of a very tall tree and was absolutely inaccessible. He finally shot the male in order to positively identify the subspecies and the nest was never finished. The trees in that vicinity have all been cut now.

Dr. Gibbs informed us (1905) that one nest was found, probably in the year 1876, near Kalamazoo, in a sycamore, near the tip of a small branch at least seventy feet from the ground. It was impossible to reach the nest, and no eggs have ever been taken in that vicinity. He took a male at Kalamazoo May 10, 1877, and other specimens were taken by George B. Sudworth, May 6, 1876 and May 3, 1877. Another specimen was received from a friend who captured it in a grocery store in Kalamazoo, September 21, 1878. Dr. Gibbs also informed us that W. H. Collins of Detroit wrote him that he had one specimen, taken there [Detroit] May 10, 1879, and another taken September 15, 1880. Mr. Walter C. Wood secured a pair near Detroit in July 1899 and feels sure that they were breeding there (B. H. Swales). Mr. Norman A. Wood of Ann Arbor tells us that there is a mounted specimen of this subspecies in the collection of Dr. Van Fossen of Ypsilanti which was taken near that place, and writes, under date of May 29, 1906, "I have found a small colony of the Sycamore Warbler along the Huron River within four miles of Ann Arbor. I secured a fine pair to mount for the Museum. The first one was seen April 22 and a male was taken on the 25th. On May 4 a female was taken and others seen, and still others were observed on May 6. These birds were feeding in a grove of trees, one-half of which were sycamores, and they seemed to avoid the other trees and feed only in the tops of the tallest sycamores, where I saw them gleaning food from all the limbs, going over them very carefully, especially on the under side. In action they resembled the Black and White Creeper, and the song as well reminds one of this bird only it is much louder and in a higher key."

All observers agree that this species is partial to sycamores and in Michigan it has been found thus far only in the valleys of streams where these trees abound. Nevertheless, it has been sought for carefully in many regions in middle Michigan where sycamores are abundant, but thus far without success.

The closely related Yellow-throated Warbler, *D. dominica,* does not occur in Michigan, although the name occurs in Stockwell's list of Michigan birds (Forest and Stream, VIII, 17, 261), and the species was erroneously included in the second edition of Professor Cook's list of 1893. This bird nests at the south among the upper branches of high trees (often pines). where it builds a bulky nest and lays four eggs, with a grayish white ground color, dotted with pale lilac. Probably the nest and eggs of the Sycamore Warbler resemble those of its near relative.

According to Ridgway the song of the Sycamore Warbler "is somewhat like that of the Indigo-bird, and it requires a practiced ear to distinguish them; the tone is remarkably similar, but there is a difference in the modulation, which, after one becomes thoroughly acquainted with it renders it distinguishable. In its motions this warbler partakes much of the character of a creeper, often ascending or descending trunks of trees or following their branches much in the manner of *Mniotilta.*" According to Dr. Gibbs "The song is a very characteristic one and bears no resemblance to anything I have ever heard. It may be expressed by the syllables 'tee-o-tee-o-tee-o, tow-tee,' accented on the second tee and with a rising inflection on the final syllable. This song is repeated at intervals of 15 seconds, and kept up for an hour or more" (Forest and Stream, July 30, 1885).

TECHNICAL DESCRIPTION.

Adult male: Upper parts clear gray with the exception of the forehead, which is black; a narrow white line from base of upper mandible to and over the eye, becoming broader behind the eye, where it often blends with a large white patch on the side of the neck; a white spot on the lower eyelid; lores, cheeks, and a line along the side of the neck deep black, continued into a series of black spots and streaks along the sides of breast and belly; chin, and throat golden yellow, sharply bounded on the sides by black and below by the pure white of the upper breast; rest of under parts white; two white wing-bars; two outer tail-feathers with terminal half of inner webs white.

Length 4.50 to 5.50 inches; wing 2.50 to 2.70; tail 2 to 2.20. Sexes alike in color and size.

281. Black-throated Green Warbler. Dendroica virens (*Gmel.*). (667)

Synonyms: Evergreen Warbler, Green Black-throat.—Motacilla virens, Gmel., 1789. Sylvia or Sylvicola virens of the older writers, Dendroica virens of the more recent.

Fig. 139.

The velvet-black throat, breast and sides, and bright yellow cheeks and face, are sufficiently characteristic in the adult male. In addition, the upper parts are rich olive green and there are two broad white wing-bars and conspicuous white tail markings.

Distribution.—Eastern North America to the Plains, north to Hudson Bay Territory; breeding from Connecticut and northern Illinois northward, and south along the Alleghanies to South Carolina. In winter south to Cuba and Panama.

This is one of our most abundant warblers during migration and is resident in considerable numbers during summer in a large part of the state. It is known to nest practically everywhere north of the Saginaw-Grand Valley, and probably nests here and there in favorable localities throughout all the southern counties as well. It is decidedly fond of evergreens, and although during migration it may occur almost anywhere, it is seldom seen during the nesting season at any great distance from groves of coniferous trees. It abounds in pine, spruce and hemlock regions, and not infrequently a belt of red cedar or Virginia juniper will be found to harbor several pairs, although the surrounding territory may yield none.

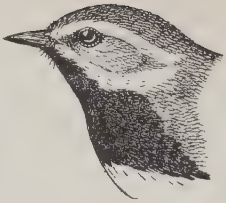

Fig. 139. Black-throated Green Warbler. From Hoffmann's Guide.—Houghton, Mifflin & Co.

It arrives from the south with considerable regularity during the first week in May, the earliest record at Ann Arbor in twenty-five years, according to Mr. Norman A. Wood, being April 24, 1905, and the average for the same period, May 3. Owing, however, to its great abundance, and the fact that its breeding area extends far northward of our state, migrants continue to troop northward all through May and doubtless some are still traveling toward their northern breeding grounds while nesting has already begun in the middle parts of the state. Records of specimens killed on Spectacle Reef Light, Lake Huron, range from May 7, 1889 and 1894 to May 18, 1891, and even to June 2 in the same year. It begins to move southward again the latter part of August and is often abundant all through September, while stragglers linger until the middle of October.

Dr. Gibbs tells us that in 1879 C. W. Gunn took a female in Ottawa county with nesting material in her bill, and both Mr. Gunn and Dr. Gibbs are confident that this species nests in Kent county as well as in Ottawa county. It was found nesting on Mackinac Island by S. E. White, and also by Dr. Gibbs, and Otto Widmann found fully grown young being fed by the parents in Emmet county, July 11, 1901. The writer also found it abundant in Emmet county in June and July 1904, and on Big Beaver Island in Lake Michigan the same season it was the most abundant and characteristic breeding warbler. Everywhere throughout the higher grounds in the Lower Peninsula, and in the Upper Peninsula, this species is a characteristic summer bird, and its somewhat monotonous and often listless song is heard at all times from earliest morning until late afternoon. It is one of the species which sings freely through the heat of the day, and its wheezy notes, which may be written "zee, zee, zee-zee-zee" come down to the traveler through the pine forests during the hottest days of midsummer.

Whether the bird rears more than one brood in a season is doubtful, but it is often heard singing well into August, and it seems not unlikely that, like its near relative, the Black-throated Blue, it may frequently rear a second family in July and August.

The nest is built almost invariably in an evergreen, sometimes on an oblique branch well out from the trunk, more often close to the main stem of a small evergreen and only ten to twenty feet from the ground. In New England it is often placed in red cedars and small white pines, and in Michigan it may be looked for in these trees as well as in balsams, spruces, hemlocks and tamaracks. The nest is compact and deeply hollowed, well built of various fibrous materials, including shreds of bark, slender roots and pine needles, and is often lined with hair and occasionally with feathers. The eggs are three to five, creamy white, spotted with brown and lilac, often with a few black specks, and average .67 by .49 inches.

This species is mainly insectivorous, and, owing to its abundance and the considerable period over which its visits extend during migration, it is one of the most valuable warblers in holding orchard insects in check. Both spring and fall it may be found gorging itself with plant lice and searching the twigs and leaves for span-worms, leaf-rollers and harmful insects of every kind. It also eats berries and possibly a few seeds, being particularly fond of the berries of the poison-ivy, and to a less extent of those of the junipers.

TECHNICAL DESCRIPTION.

Adult male: Entire upper parts bright olive-green, usually without spots or streaks; throat and upper breast clear black, this continued as a series of streaks and spots along either side; remainder of breast and belly white or yellowish-white; sides of head and neck mainly bright yellow, with a dusky streak through the eye and a similar shade on the ear-coverts; wings and tail dusky, the former with two white bars across the coverts, the latter with the inner webs of the two outer pairs of feathers entirely white. Female similar, but with the black and yellow areas more or less obscured by gray or whitish tips of the feathers, and throat and breast often washed with yellowish. Young of the year resemble the female, but the markings are still more obscure.

Length of adult male 4.35 to 5.40 inches; wing 2.40 to 2.55; tail 1.90 to 2.05; female somewhat smaller.

282. Kirtland's Warbler. Dendroica kirtlandi (*Baird*). (670)

Synonyms: Jack-pine Warbler, Jack-pine Bird.—Sylvicola Kirtlandii, Baird, 1852. —Dendroica, or Dendrœca, kirtlandi of other authors.

Plate LXI.

Our only warbler which combines black-streaked pale yellow under parts, black-streaked bluish-gray upper parts, and white-marked outer tail-feathers. In addition, it has white on both eyelids, forming practically a white eye-ring, and the whitish wing-bars, if present at all, are narrow, dull and inconspicuous.

Distribution.—Eastern United States from Florida to northern Michigan during migration, and west to Missouri, Wisconsin and Minnesota; breeding, so far as known, only on the jack-pine plains of Michigan north of 44°. Winters in the Bahamas.

This has been considered the rarest warbler of the United States, and although described in 1852, from a specimen collected by Chas. Pease near Cleveland, Ohio, May 13, 1851, its summer home remained a mystery until 1903, when it was shown to be a not uncommon bird on the jack-pine plains of northern Michigan, where nests, eggs and young were taken by Mr. Norman A. Wood of Ann Arbor, Michigan. The bird was named Kirtland's Warbler in honor of J. P. Kirtland of Cleveland, in acknowledgment of his great services in the promotion of knowledge of the natural history of the Mississippi Valley. Although the specimen above alluded to is the type specimen, a bird of the same kind had been taken at sea, near the Bahama Islands, by S. Cabot, Jr., probably in 1840. From this time until 1898 single specimens were taken at rare intervals in the eastern United States to the number of nineteen or twenty in all, while it was discovered that the bird wintered in the Bahama Islands, where a total of about fifty specimens (probably just 55) have been taken.

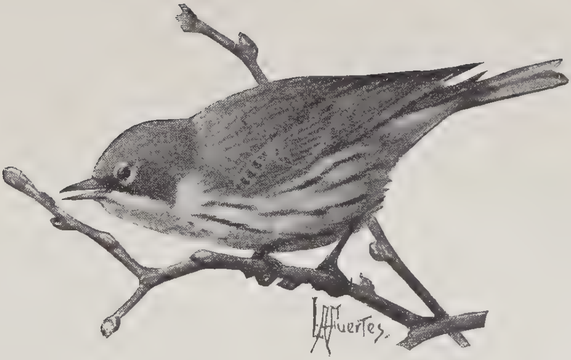

Plate LXI. Kirtland's Warbler.

From Coues' Key to North American Birds, 5th Edition, 1903.
Dana Estes & Company.

The specimens taken in the United States were collected in widely separate localities, but by far the larger number in Ohio and Michigan. The following is the list of specimens taken in Michigan, as given by Mr. Norman A. Wood in March 1904:* Two females, collected at Ann Arbor by A. B. Covert, May 15, 1875 and May 16, 1879; 1 male, collected by N. Y. Green at Battle Creek, Michigan, May 11, 1883; 1 male, found dead at foot of Spectacle Reef Lighthouse, Lake Huron, by the keeper, William Marshall, May 21, 1885; 1 male, collected by L. Knapp, at Ann Arbor May 18, 1888; 1 specimen, collected by F. H. Chapin, Kalamazoo county, Mich., in 1898; 1 female, collected by Norman A. Wood, at Ann Arbor May 14, 1902; 1 male, collected by T. G. Gale, near Luzerne, Oscoda county, Mich., June 15, 1903, and 7 adults and 7 nestlings, collected in Oscoda and Crawford counties, Michigan, by Norman A. Wood, between July 2 and July 15, 1903.

During the years which have since elapsed the taking of this warbler, or its nest and eggs, has been contrary to the law of the state and few specimens have been recorded. Doubtless, however, several have been taken, and competent observers have reported the bird as seen in various parts of the jack-pine plains north of 44°. During the past summer (1911) the writer visited various parts of the jack-pine plains, outside of the known nesting range of Kirtland's Warbler, in the hope of extending this area and perhaps adding something to the knowledge of the species. Eight days (July 1 to 8) were spent in the search, but the season was so far advanced and the heat so intense (exceeding 100° on all but two days) that the conditions were very unfavorable and the trip was entirely fruitless so far as this species was concerned. The areas examined included large and promising stretches of pine lands in Lake, Manistee, Wexford, Grand Traverse, Kalkaska and Crawford counties, as well as some of the better hardwood lands of Antrim and Otsego counties. No trace of the warbler was found, however; either it did not inhabit the localities visited or had ceased to sing, owing to the late date and the intense heat. The latter explanation is at least possible and it must not be assumed that the species does not occur in some of these places, at least occasionally.

Comparatively little is known of the habits of this rare warbler. An excellent resume of our knowledge of the species up to 1898 is given by Mr. F. M. Chapman in the Auk, Vol. 15, 1898, pages 289-293, accompanied by a good colored plate (two figures) by Fuertes. A full account by Norman A. Wood of the discovery of the breeding area, with description of the nest and eggs, will be found in the Bulletin of the Michigan Ornithological Club, V, 1904, pages 1-13; following which, on pages 14 to 21, is an article by Dr. Chas. C. Adams on the migration route of Kirtland's Warbler. From these sources the following brief account is condensed:

During the winter Kirtland's Warbler apparently ranges through the Bahama Islands, and begins its northward migration in April, reaching South Carolina about the end of that month. It has been reported from Illinois May 7, from Indiana May 4 and 7, from Ohio May 12 and 13, from Battle Creek, Mich., May 11, from Ann Arbor May 15, 16 and 18, and from Spectacle Reef Light, Lake Huron, May 21. The records, few as they are, show that the birds are widely scattered during the northward migration, and although a considerable proportion would indicate that they were on their way to the known nesting region in northern Michigan, it seems extremely likely that the breeding area covers a much larger territory than we now know of, very possibly extending into northern Wisconsin and Minnesota, as well as over much of the area between Lake Superior and Hudson Bay, and possibly stretching eastward toward Labrador and westward to or into Manitoba.

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*Bull. Mich. Orn. Club, V, 1904, pp. 12-13.

During migration the bird is known to frequent low growths, but has not been noticed to spend much time upon the ground, or to show any marked fondness for evergreens. On its nesting grounds it frequents regions characterized by the presence of jack-pines, larger Norway pines, and, where these have been cut off, "more or less thick growths of small jack-pines, yellow oak and poplar." The ground is covered with a mat of wintergreen (Gautheria), sweetfern and trailing arbutus. Burnt stubs give evidence of forest fires and there is a variety of small shrubs and young trees which varies with the locality. In this region Kirtland's Warbler may be found anywhere, the males perched on the branches or tops of low trees, rendering their clear loud song at frequent intervals, while the nest is placed on the ground and completely hidden among the vines and herbage. Mr. Wood describes the nest as about two inches in diameter inside, and the same in depth, very neat and compact, and composed of strips of soft bark and vegetable fibre, thickly lined with fine dead grass, pine needles and a few horse hairs. The single egg, taken from a nest in which were two young birds about ten days old, is described as "a delicate pinkish white (since the contents are removed it has faded to dull white), thinly sprinkled with several shades of brown spots, forming a sort of wreath at the larger end." This egg is .72 by .56 inches.

In the Oologist, Vol. 21, 1904, No. 10, Mr. E. Arnold describes two nests and eggs, taken in Oscoda county, Michigan in 1904, as follows: "On June 15th I took a male and female and beautiful nest and four fresh eggs. These, so far as I know, are the first full sets of this bird known to science. The nests were on the ground, in dead vegetation of deer-vines, wintergreen and various vines. The female is a very close sitter and the nests very hard to find. Dendroica kirtlandi is confined during the breeding season to the jack-pine plains. The nest is sunk in the ground and always well concealed by surrounding vines and vegetation. The female on the eggs allowed me to stand within six inches of the nest and to almost touch her; I could have put my hat over her on the nest. The male is a beautiful singer and very noticeable."

Prof. Lynds Jones, who studied two migrant Kirtland's Warblers near Oberlin, Ohio on May 7 and 9, 1900 says: "The song was loud and clear, given with all the vigor of a wren or kinglet, and the body being straightened to almost a perpendicular direction and beak pointed straight up. * * * The song is a doubly phrased one, the first part slightly longer and a little less rapidly uttered. I have written it thus; ter ter ter tee; tswee te chu." (Wilson Bulletin, No. 32, July 1900).

Mr. Wood, in his description of the bird's habits on its nesting ground, speaks of its song as "loud, clear, joyous and full of sweet melody. This song may be described as follows: 'weche chee-chee-chee-r-r-r.' The r-sound is quite prolonged and loud. The first two notes are low, then the notes gradually increase in volume to the end. I heard this song repeated at intervals of about thirty seconds and from different directions. * * * Finally I saw the singer flit from a bush to a yellow oak scrub and light but three feet above the ground. As I watched him he sat quite erect, threw forward his head and the wonderful song rang out. This song was remarkable because of its volume and rich melody." Another male which

Mr. Wood watched "went to the top of an old burnt stub (about twenty feet high) nearby and sang 'wichi chee-chee-cher-r-r.' The song of this male was not so loud and ringing, and was not so full of melody as the first, but was very sweet and clear. It made me think of the song of the Maryland Yellowthroat, only the notes were shorter. * * * * often saw these birds alight on the ground, and think them to be as terrestial as *Dendroica palmarum.* The food of this warbler seemed to be span-worms living upon jack-pines, and a small light-colored span-worm moth (Diastictis). I saw the warbler capture these moths during flight. I also shot a male Kirtland that came to a nest with a deer-fly in his mouth, so that flies and other insects, as well as span-worms, may compose their food. On describing the bird, its food and its habits, to a young man who lives a few miles northwest, on the North Branch, he said the birds were there and were called "the jack-pine bird." I consider this a very appropriate name, as most of their time is spent on these trees and the bulk of their food is gleaned from them. It is not, however, every jack-pine plain that is the home of a colony, as I examined hundreds of acres where the conditions seemed all right and found none."

Several observers speak of the resemblance of this bird in action to the Palm Warbler, particularly in the wagging motion of the tail. The somewhat stiff and erect attitude of the bird in singing has also been noted, and the figure given by C. J. Maynard (Birds of Eastern North America, plate 17) represents correctly, according to Mr. N. A. Wood this "very characteristic upright singing attitude." In size and general appearance Kirtland's Warbler suggests a young autumn specimen of the Myrtle Warbler (*Dendroica coronata*), but lacks the yellow rump and crown patch, has no black patches on the sides of the breast, and the wing-bars are very narrow, dull and inconspicuous. The black-streaked yellow under parts remind one of the Prairie Warbler, but that is a much smaller bird, the yellow of the under parts is much brighter, and it also has bright yellow on the sides of the head, where Kirtland's Warbler is blackest. The upper parts are entirely unlike in the two birds.

TECHNICAL DESCRIPTION.

Adult male: Gray or slaty-gray above, bluer on head, browner on back, which is strongly streaked with black; lores, cheeks, and sides of throat black; eye-lids white; chin and under tail-coverts white, rest of under parts yellow, the breast with small spots of black, the sides heavily black-streaked; wing bars very indistinct or altogether lacking; outer pair of tail-feathers with white patch on inner web near tip. Female, similar, but duller, the sides of head gray, under parts paler yellow, spots and streaks lighter and less distinct.

Length 5.30 to 6 inches; wing 2.60 to 2.90; tail 2.25 to 2.50.

283. Pine Warbler. Dendroica vigorsi (*Aud.*). (671)

Synonyms: Pine-creeping Warbler, Pine Creeper.—Sylvia vigorsii, Aud., 1828.—Sylvia pinus, Wils., 1811, Bonap., 1824, Nutt., 1832, Aud., 1834.—Dendroica and Dendrœca pinus of many of the older naturalists, Dendroica vigorsii, Ridgw., 1885, and most subsequent authors.

The adult male may be known by the olive-green upper parts; clear yellow throat and breast, without streaks; two narrow white wing-bars, and long oblique white patches on the outer tail-feathers. Females and immature birds will be likely to puzzle any but the expert.

Distribution.—Eastern United States, west to the Plains, north to

Manitoba, Ontario and New Brunswick; wintering in the South Atlantic and Gulf States, and the Bahamas.

This appears to be one of our less common warblers in most parts of the state, although a few are met with in migration almost every spring, and it is one of the characteristic summer residents of the pine regions of the north.

It is one of the earlier warblers to come north, probably entering the state by the first of May in average seasons and not infrequently earlier. At Ann Arbor Mr. Norman A. Wood's earliest record is April 21, 1888, and it was observed on April 28, 1898, May 6, 1904, and April 26 and 27, 1907. While it shows a marked preference in its summer home for evergreen trees, it mingles freely with other warblers during its migration and then may be found almost anywhere. It is by no means a conspicuous warbler, and since it prefers to sing from the higher parts of the pine trees, is doubtless often overlooked by those who are not familiar with its notes.

The full song is a mellow trill, suggesting in length and rapidity that of the Chipping Sparrow, but the notes are clearer, sweeter and more musical.

It builds a compact and deeply hollowed nest, usually on the branch of a pine or other evergreen, at a considerable height from the ground, often fifty feet or more. The eggs are white or grayish-white, spotted with brown and gray, and average .69 by .53 inches. It has been found nesting in northern Illinois and probably it nests in favorable localities throughout Michigan, but most abundantly in the northern part of the state. Actual records of nests however are not numerous. Miss Harriet H. Wright, of Saginaw writes that in the northwest corner of Iosco county she found two nests where the parents were feeding young, in pines, on a sandy knoll a little distance from the Au Sable River, during the last week of June, 1907; and there is a record of a nest in Mason county containing nearly full grown young on July 12 (Chaney, Auk, XXVII, 1910, 277).

Dr. Gibbs states that in Ottawa county, in 1879, the species was more or less common in summer, but was seldom found out of the tops of the tallest pines. He says "All day the simple notes can be heard issuing from the lofty pines, but few guns would bring the specimen from such a height." He states further that in Wexford county, about Cadillac, it was common and well distributed in 1882, and could always be found in the proper localities, while on May 6, 1883 he found a pinery in Montcalm county full of them, and in that region he considered it the commonest warbler of the pine sections. He also found it abundant in June in Newaygo county, and in Lake county as late as October 12, 1883.

It is perhaps somewhat more addicted to a creeping habit than most of its congeners, but the name "Pine Creeper" is hardly warranted, since it is a typical warbler, feeding much on insects of all kinds, in the foliage as well as on trunks and branches, and not infrequently taking insects on the wing.

TECHNICAL DESCRIPTION.

Adult male: Above, uniform rather dull olive-green, including the sides of the head and neck; under parts yellow, often greenish, brightest on throat and breast, fading to dull white on belly and under tail-coverts; two white or grayish white wing-bars; two or three pairs of outer tail-feathers mostly white (both webs) near tips; eyelids and a streak over the eye usually yellow. Female similar, but with much less color; above grayish-olive, below grayish-white, the breast and throat often merely tinged with yellow; wings and tail as in male except that the wing-bars are narrower and grayer.

Length 4.95 to 5.60 inches; wing 2.70 to 3; tail 2.10 to 2.45. Female rather smaller.

284. Palm Warbler. Dendroica palmarum palmarum (*Gmel.*). (672)

Synonyms: Western Palm Warbler, Western Red-poll Warbler, Western Yellow Red-poll Warbler, Wagtail Warbler.—Motacilla palmarum, Gmel., 1789.—Sylvicola petechia, Sw. & Rich., 1831.—Dendroica palmarum, A. O. U. Check-list, 1886.

Yellow below from chin to under tail-coverts, streaked on breast and sides with reddish-brown and dusky. Crown chestnut; wing-bars indistinct or wanting; outer tail-feathers white-tipped on inner webs.

Distribution—Northern interior to Great Slave Lake; in winter South Atlantic and Gulf States, the West Indies and Mexico. Of rare but regu'ar occurrence in the Atlantic States in migration.

This is another of our hardy warblers, arriving early in the spring and lingering late in the fall. It enters the state from the south about the first of May, sometimes as early as the 20th of April, and passes northward in a leisurely manner, some lingering until after the middle of May. At Ann Arbor Mr. Wood gives the earliest date in twenty-five years as April 26, 1886, and it is seldom seen at Lansing before the 6th or 7th of May. However, a specimen was killed on Spectacle Reef Light, northern Lake Huron, May 5, 1889, and others on May 11, 1888, May 15, 1891 and May 19, 1893. Fall records for the same lighthouse are September 25 and 29, 1889, October 3, 1893 and October 5, 1890.

Although entirely unlike the Yellow-rumped Warbler in appearance, the two species have many points in common, and the present bird is equally fond of the ground, where it alights constantly for food, hopping about in search of seeds and insects, very much like a sparrow. It is usually found in flocks, sometimes as many as fifty together, though more often in small squads of six to ten. It frequents the edges of fields, the borders of woods and the sides of hedges and roads, but is also seen frequently in open fields, particularly in the wetter parts of cattle pastures, where it perches on weed-stalks or on the ground, and when alarmed flies to the nearest fence, where it sits, wagging the tail up and down in a manner entirely unlike that of any other warbler.

Apparently it is not very abundant in Michigan, most of our reports stating that it is rare, rather uncommon, or at least irregularly common. It is not known to nest within our limits, nor has it been recorded from any part of the state in summer, so far as we are aware. Usually by the 20th of May it has passed northward beyond out borders, and it returns again in September. It is the only warbler of its genus (except Kirtland's) which regularly nests on the ground, a fact entirely in keeping with its terrestrial habits. In New England, where it (or its equivalent subspecies, *hypochrysea*) is abundant, it has been known to nest occasionally, both fresh eggs and newly hatched young being found near Bangor, Me., June 1, 1892, and another nest at Pittsfield, Me., with five fresh eggs June 13, 1894.

The usual nesting ground of the western form is in the Hudson Bay region and Alaska, where it is said to nest at the foot of a small tree or at the edge of a hummock, sinking its nest among the grasses and mosses. The nest itself consists of these materials, together with bark strips, down and feathers, and the eggs are creamy white, spotted with purple and reddish brown. The eggs probably are of about the same size as those of the eastern form which measure .67 by .52 inches.

While with us during migration this species has only a sharp "chip" or "chuck" which is, however, quite characteristic. In its summer home it is said to have a pleasant but rather weak trill.

TECHNICAL DESCRIPTION.

Adult: Forehead and crown clear chestnut, sharply separated from the color of the back, which is grayish-olive, indistinctly streaked with brownish; rump and upper tail-coverts usually distinct greenish-yellow; a yellow line from nostril over and behind the eye; sides of head and neck like back; under parts yellow, brightest on throat and breast, fading to yellowish-white on belly, the chin and throat usually unspotted, the breast and sides spotted and streaked with chestnut; under tail-coverts bright yellow; two indistinct grayish wing-bars; two outer pairs of tail-feathers with inner webs white at tips. Sexes alike.

Length 4.50 to 5.50 inches; wing 2.35 to 2.65; tail 2.05 to 2.45.

285. Prairie Warbler. Dendroica discolor (*Vieill.*). (673)

Synonyms: Sylvia discolor, Vieill., 1807.—Sylvicola discolor, Jardine, 1832, Aud., 1839.—Dendroica and Dendrœca discolor of most recent authors.—Sylvia minuta, Wilson, 1811.

Fig. 140.

The male is readily known by the patch of chestnut or brick red spots in the middle of the back, and a trace of this is commonly visible in the female. The under parts are rich yellow, the sides with dark streaks.

Distribution.—Eastern United States to the Plains, breeding from Florida north to Michigan and southern New England. Winters in southern Florida and the West Indies.

This dainty little warbler appears to be by no means common in Michigan, yet it has been found here and there in some numbers, particularly in Ottawa and Montcalm counties by Dr. Morris Gibbs, and on Mackinac Island by S. E. White. This latter point would seem to be its northern limit in the state, and it is a singular fact that, although Mr. White states that it was common there in bushy country and that he took many specimens between August 10 and September 6 in 1889, 1890 and 1891, it did not appear to be nesting there, and it has not been found there since by any one else. Moreover, among the thousands of warblers killed on Spectacle Reef Light, within eighteen or twenty miles of Mackinac Island, not a single specimen of the Prairie Warbler has ever been found.

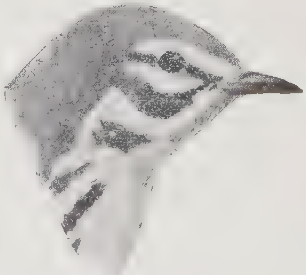

Fig. 140. Prairie Warbler. From Coues' Key, 5th ed., 1903. Dana Estes & Co.

The name "Prairie Warbler" is simply a misnomer, since the bird is rarely seen on the open prairie, and is not known to nest anywhere in the prairie regions of Indiana, Illinois or southern Michigan. On the contrary the bird appears to prefer bushy pastures, recently cleared lands, and scrubby woods. For this reason the name Red-backed Warbler or even Pasture Warbler would be preferable.

Our records are not numerous enough to give much idea of its migration, but Mr. Norman A. Wood has noted it at Ann Arbor seven times during the last thirty years, the earliest record being May 2, 1905, and the other records May 11, 1880, May 18, 1900, May 10, 1902, May 9, 1903, and May 13 and 14, 1907. There is one record for Port Huron, St. Clair county, a specimen taken by P. A. Taverner, May 20, 1900; N. A. Wood found a few migrants on Charity Island August 22 and 24, 1910; a single specimen was seen at the Agricultural College May 11, 1900; Mr. Swales states that it was found nesting near Detroit by W. A. Davidson May 27, 1894, but the bird was not secured; Taverner took three specimens near the same city, May 10, 1907. Other collectors in the vicinity of Detroit have failed to find the species, either as a migrant or a resident, and, with the exceptions already noted, observers in other parts of the state have been equally unfortunate. The nest found by Dr. Gibbs in Ottawa county was taken May 26, 1879. It was about two feet from the ground, in a small bush, and was made of dandelion down, bark of weeds and fibres of milkweed, and lined with woodchuck hair. It contained two eggs, and the ovary of the parent taken contained another egg almost ready to be laid.

Dr. Gibbs states that he found this a rather common warbler near Howard City, Montcalm county, in 1881 and 1882. He heard the first there (at least a dozen) on May 9, 1881, and on the same date the following year they were already numerous. May 14, 1882 he found them common and unsuspicious, but later, during the nesting season, they were so shy that it was difficult to secure a specimen.

The eggs are white or buffy-white, speckled with burnt-umber or vandyke-brown and lilac gray, and average .63 by .47 inches (Ridgway).

The song of this warbler is neither loud nor striking, but is sufficiently characteristic for recognition after one becomes familiar with it. Butler describes it as "beginning low and gradually growing louder, resembling the syllables 'wee-wee-chee-chee-chee-chee'" (Birds of Indiana, 1897, p. 1077).

The food appears to be similar to that of other warblers frequenting like situations.

TECHNICAL DESCRIPTION.

Adult male: Upper parts uniform olive-green, the middle of the back spotted conspicuously with brick-red or chestnut; a bright yellow streak from bill over and beyond the eye; entire under parts clear rich yellow, unspotted along the median line, but heavily streaked with deep black on sides of neck and breast and on flanks; a small black spot in front of eye, and a larger one bounding the cheek below, and separated from the eye by a narrow area of yellow; two white wing-bars; three outer pairs of tail-feathers mostly white on inner webs, the fourth feather with a small white spot. Female similar, but with less chestnut or none on the back, and other markings somewhat duller.

Length of male 4.25 to 5 inches; wing 2.10 to 2.30; tail 1.90 to 2.10. Female slightly smaller.

286. Ovenbird. Seiurus aurocapillus (*Linn.*). (674)

Synonyms: Golden-crowned Thrush, Teacher, Nightingale.—Motacilla aurocapilla, Linn., 1766.—Turdus aurocapilla, Wils., Bonap., Aud., Nutt.

Figure 141.

The broad golden-brown stripe through the middle of the crown with the narrow stripe of black on either side, together with the absence of white spots on the tail-feathers, is diagnostic. The olive back and the heavily spotted breast and sides give it the appearance of a small thrush, but in reality it is a large warbler.

Distribution.—Eastern North America, north to Hudson Bay Territory and Alaska, breeding from Kansas, the Ohio Valley and Virginia northward. In winter Florida, the West Indies, southern Mexico and Central America to Panama.

The Ovenbird is a common summer resident of our woodlands throughout the state. It may be absent from certain restricted regions, but we have never visited a place in the state where it was not found, and it is reported as common by almost all our correspondents. According to Peet it is a rather scarce resident on Isle Royale.

It arrives from the south rather early, Mr. Trombley of Petersburg, Monroe county, recording the earliest on April 22, 1891, while in 1888 the first was seen on May 9. At Ann Arbor Mr. Norman A. Wood gives the average date of first arrival for twenty-five years as the first week in May, the earliest being April 28, 1900 and the latest May 11, 1901. Most of the birds move southward in September, mainly during the latter half, but a few linger into October.

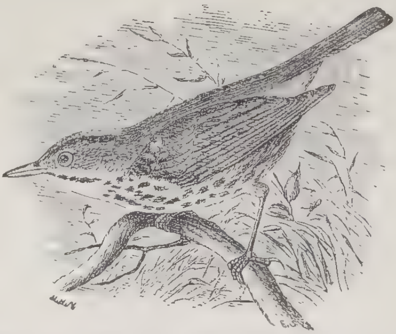

Fig. 141. Ovenbird. From Baird, Brewer & Ridgway's North American Birds. Little, Brown & Co.

Its ringing song of "teacher, teacher. teacher" so well described by Burroughs, is not always given immediately on arrival, but within a few days if the weather be fair the woods are echoing with it. The bird often sings from the ground or from a stick, stump or stone, but usually from a branch of a tree at some little height above the surface, though seldom from the top of a tree or from any lofty perch. It spends most of its time running about on the ground, where it gathers almost all its food, and it has a habit when moderately disturbed of walking lengthwise along a branch with a deliberate slow step, like a chicken, often jetting the tail in the manner of the Hermit Thrush, but with less energy than its near relative the Water-thrush.

The nest is built late in May or early in June, in the middle counties, and is a beautiful structure, being sunken somewhat in the ground and carefully roofed over with leaves and grasses, in the manner of an old-fashioned oven, whence the bird gets the name of Ovenbird. So cleverly is the nest concealed that it is rarely found except by flushing the bird, and in order to do this one must step very close to the nest. Even then the owner usually attempts to lead the enemy away by feigning injury, and often succeeds. In spite of its good concealment the Cowbird appears to find the nest easily, and in many localities it is a rare thing to find a nest free from one or more eggs of this parasite. The Ovenbird suffers much from squirrels, skunks, weasels, snakes and other prowlers, so that the first nest is often broken up and the bird compelled to lay a second or even a third time. Doubtless this accounts for the fact that young, or even eggs, may frequently be found late in July or occasionally in August, for we do not think the bird rears two broods as a rule.

Aside from the so-called song of "teacher, teacher, teacher" this bird has a delightful carol which it utters from a considerable height in the air while it floats slowly down on motionless wings, eventually dropping like a stone into the woods as it finishes the last notes. Occasionally it utters a few notes as it rises swiftly to the height at which the song proper begins, but more often it wings its way upward silently and bursts into song suddenly as it reaches the highest point of its flight. This song somewhat resembles the air song of the Indigo-bird, but is sweeter and longer continued; it must not be confounded, however, with the still more beautiful song which the Ovenbird sometimes utters at nightfall while coursing rapidly through the trees of the forest, either alone or while pursuing its mate or being pursued by some rival male. Under such circumstances it gives vent to its emotions in a prolonged and varied song of remarkable sweetness and power which is unlike that of any other bird of our acquaintance. Doubtless it is this song, occasionally uttered in the night, which has given it the name of nightingale in some localities.

The eggs are four to six, white or pinkish white, spotted with reddish brown and lilac, and average .80 by .61 inches.

This bird is rarely seen seen outside the woods except during migrations, but it often visits parks and gardens in spring and fall and occasionally may be heard singing in such places. It appears to have no bad food habits, or indeed, bad habits of any kind, but consumes immense numbers of insects, spiders, myriapods and small snails and slugs, together with a few seeds and berries. It is thus likely to be decidedly beneficial in the regions which it selects for its home.

TECHNICAL DESCRIPTION.

Adult: Crown with a broad median stripe of brownish-orange, extending from forehead to nape and bordered on each side by a narrow black stripe; rest of upper parts, including wings and tail, clear greenish-olive; a distinct whitish ring about the eye; below pure white, heavily spotted on breast and streaked on sides with black, the chin, upper throat and belly unspotted. No white markings on wings and tail; a black line on each side of the white throat from base of lower mandible. Sexes alike.

Length 5.40 to 6.50 inches; wing 2.75 to 3; tail 2 to 2.25.

287. Small-billed Water-thrush. Seiurus noveboracensis noveboracensis (*Gmel.*). (675)

Synonyms: Common Water-thrush, Northern Water-thrush, Wag-tail, Water Wagtail, Water-thrush.—Motacilla noveboracensis, Gmel., 1789.—Siurus nævius, Coues, 1877.—Seiurus noveboracensis of most recent authors.

A large thrush-like warbler, plain olive-brown above, with a yellowish stripe over the eye; the under parts white, tinged with sulphur yellow, and everywhere sharply streaked with brown and black. Wings and tail like the back and without bars or spots.

Distribution.—Eastern United States to Illinois, and northward to Arctic America, breeding from the northern United States northward, South in winter to the West Indies, Central America and northern South America.

The Water-thrushes will usually be recognized at once from their close resemblance in size and general appearance to the Ovenbird, but all have the habit of wagging the tail much more strongly pronounced than in the Ovenbird, in fact the motion is even more continuous and characteristic than that of the Spotted Sandpiper or Tip-up, and, except when singing, the Water-thrushes seem to be always balancing or tilting.

The Small-billed Water-thrush is by no means rare in any part of Michigan during the migrations and very likely it may breed in the northern parts of the state, but it is for the most part a migrant, and in spite of the numerous reports of its nesting in the southern counties we know of but one instance which has been verified by the capture and examination of the bird. Mr. Edwin G. Mummery took a nest and five eggs, together with the female parent, at Chestnut Ridge, Wayne county, Michigan, May 14, 1898. The nest was close to and partly under the trunk of a fallen tree. The eggs were heavily incubated (Bull. Mich. Orn. Club, IV, 1903, 56). We have not personally examined the above specimen, but have been informed that its identity is not open to question. The early date would be about right for the Large-billed Water-thrush. The earlier observers in the state almost universally confounded this species with the Large-billed Water-thrush, which is the common form in southern Michigan, and except where specimens have been taken and preserved it is well nigh impossible now to say to which species any given observation relates. Since 1890 these two birds have been discriminated more carefully by most observers, but the attempt to recognize Grinnell's Water-thrush, *S. n. notabilis*, has complicated the matter again.

The Small-bill seems to arrive from the south much later than its near relative the Large-bill, the records from Spectacle Reef Light, Lake Huron, being May 11, 1888, May 12, 1890, May 15, 17 and 19, 1891, and, on the southward migration, August 22, 1889. Other unquestionable records are: One specimen taken at Agricultural College September 11, 1896, by T. L. Hankinson, one taken May 13, 1875 in Kalamazoo county by James H. Deming, and others by Dr. Gibbs on May 16 and 20, 1883, in Montcalm county. Dr. Gibbs also took one May 12, 1885 in Van Buren county, and the writer found several within the city limits of Lansing, August 19, 1897. We have examined also a skin in the Eddy Collection taken on Heisterman's Island, Saginaw Bay, August 29, 1888. At Detroit, according to Mr. Swales, it is not a common bird except on its first appearance in the spring about the first week in May. It is seen again there in the fall until late September and was found once, in 1889, as late as October 8.

As already stated we have but one probable record of its nesting in the state, but it may nest here frequently nevertheless. In Wisconsin it is said to nest sparingly even in the southern counties and more commonly and regularly farther north. "We are almost exactly on the dividing line between *noveboracensis* and *notabilis*, but the former is by far the most abundant. They occur together in southeastern Wisconsin during the migrations. Mr. William Brewster has kindly examined our specimens and finds very typical examples of both races."—(Kumlien and Hollister, Birds of Wisconsin, p. 116).

In nesting habits this bird is quite similar to the Large-billed Water-thrush, building a bulky, but somewhat loosely constructed nest, which is placed sometimes in the roots of an upturned tree, sometimes in the bank of a brook or stream, and occasionally perhaps on the level ground in a swamp, though in the latter case it is almost always partially roofed over or protected above by fallen branches or other rubbish. The eggs are four to six, creamy white, speckled with brown and lilac, and average .75 by .57 inches.

The song during the nesting season is described as clear, loud and ringing;

audible at a distance of several hundred yards, and one of the most striking and characteristic of bird songs. Opinions differ somewhat as to its similarity to the songs of the other Water-thrushes, some observers stating that the songs of this and the Large-billed Water-thrush are nearly identical, while others claim that they are perfectly distinct. In view of the confusion of the two species by even fairly good observers it seems likely that the song of one has not unfrequently been mistaken for that of the other.

TECHNICAL DESCRIPTION.

Adult: Entire upper parts, including wings and tail, uniform olive-brown; a whitish or yellowish-white stripe from nostril over eye toward nape; ear-coverts brown like back; under parts whitish, usually with a distinct yellow tint which is likely to be strongest on the belly, the throat thinly speckled, and the breast and sides thickly spotted and streaked with dark brown; wings and tail unmarked; iris brown. Sexes alike.

Length 5 to 6 inches; wing 2.80 to 3.10; tail 2 to 2.25; culmen .43 to .50.

288. Grinnell's Water-thrush. Seiurus noveboracensis notabilis. *Ridgw.* (675a)

Synonyms: Western Water-thrush.—Seiurus nævius notabilis, Ridgw., 1880, and most recent writers.

Very similar to the Small-billed Water-thrush, but slightly larger, darker brown above and whiter below, the yellowish tinge often barely perceptible.

Distribution.—Western United States, from Indiana and Illinois westward to California, and north into British America. Casual in migrations eastward to the Atlantic coast. Winters from the southern border of the United States southward to Lower California, Mexico and northern South America.

Probably the majority of the Water-thrushes that pass through Michigan during the migrations belong to the Small-billed subspecies, the larger form becoming abundant farther west. Nevertheless, Grinnell's Water-thrush has been taken several times within our limits and it seems likely that it occurs somewhat frequently. Naturally, as this is merely a geographical race of the Small-billed Water-thrush and Michigan is not far from the dividing line between the two, the forms must overlap more or less and specimens completely intermediate are likely to occur. In Butler's Birds of Indiana (1897, page 1382) we read: "Mr. Ridgway writes me that Water-thrushes from the Mississippi Valley are very puzzling, but a large majority appear to be referable to *notabilis.* Mr. F. M. Woodruff informs me that Dr. J. A. Allen, to whom he submitted some specimens from the vicinity of Chicago for examination, considers them typical *notabilis.*" Mr. Woodruff adds: "All the specimens I have from northern Indiana are of this form." A specimen of Grinnell's Water-thrush was killed on Spectacle Reef Light, Lake Huron, May 7, 1889 and another May 22, 1890. Both these were identified by Dr. A. K. Fisher, of the U. S. Department of Agriculture at Washington. The University of Michigan Expedition obtained an adult female on Isle Royale August 24, 1904 and an adult male on August 26. According to Mr. Norman A. Wood others were seen there on August 18, 22, 28, 31 and September 1. On the latter date Mr. Wood states that he heard one in a cedar swamp singing a low sweet song.

So far as we know this form does not differ in general habits from its near relative *noveboracensis*, but our observations on the bird in Michigan are so few that we can add nothing definite on this point.

TECHNICAL DESCRIPTION.

Very similar to the Small-billed Water-thrush, but somewhat larger, the upper parts darker brown, the line over the eye whiter, and the lower parts less distinctly yellow. Sexes alike.

Length 5.50 to 6.50 inches; wing 2.90 to 3.25; tail 2.10 to 2.50; culmen .44 to .50.

289. Large-billed Water-thrush. Seiurus motacilla (*Vieill.*). (676)

Synonyms: Louisiana Water-thrush, Southern Water-thrush, Wag-tail, Water Wagtail.—Turdus motacilla, Vieill., 1807.—Seiurus ludovicianus of the older ornithologists, 1838-1880.—Siurus motacilla, Coues, 1877.

Similar to the two preceding, but larger than either; lighter brown above and buffy white below with no sulphur yellow tinge; the streaks on breast and sides broad and brown; throat without spots or streaks; stripe over the eye pure white.

Distribution.—Eastern United States, north to southern New England and southern Michigan, casually north to Lake George, northeastern New York, west to the Plains. In winter West Indies, southern Mexico, and Central America to Panama.

This is the common Water-thrush of southern Michigan and the only one thus far positively known to nest in the state. It is a summer resident of at least the southern third of the state, but so far as we can learn there is no record of its occurrence north of Montcalm county. As explained in connection with the Small-billed Water-thrush these two species have been badly confused by observers and there is much incertainty about some of the notes, but we have never seen a specimen from any point north of the Saginaw Grand Valley, and it is significant that no specimens of this species have ever been received from Spectacle Reef Light, where so many thousands of migrants have been killed, and from which place specimens were sent to Washington for more than a dozen years.

It is fairly common at Port Huron, Lansing, Grand Rapids, and all territory south of these points, arriving from the south almost invariably in April, not infrequently before the middle of the month. At Agricultural College, Ingham county, Mr. Hankinson recorded the first on April 12, 1896 and April 22, 1897, while at Detroit Mr. Swales gives its time of arrival as April 20 and May 1. At Ann Arbor Mr. Norman A. Wood gives the earliest arrival in spring as April 22, 1883, and the average as May 7, but we feel sure that the species as a rule arrives much earlier than these records would indicate, especially as the average date of arrival for the Small-billed Water-thrush is given as May 10. In our own experience in Ingham county, covering seventeen years, we have found the Large-billed Water-thrush to precede the Small-bill by at least ten days on the average.

This bird frequents very wet ground always, but is by no means confined to running streams, since it is a regular inhabitant of more or less stagnant swamps, and is not infrequently found in bushy marshes at some little distance from large woods. It usually nests among the upturned roots of a prostrate tree, but also hides its nest under the edge of a fallen log or in the sloping bank of a small stream, or even among the tangled roots at the edge of a cut, where a stream has washed away the soil at a bend, In other cases it nests on the ground in an ordinary swamp, placing the nest under the roots of a tree or otherwise hiding it from view. Mr. Trombley records a nest found in Summerfield township, Monroe county, which was nearly complete on May 8, 1891 and which contained six eggs with two Cowbirds' eggs in addition on May 19. This nest was placed beneath the roots of a tree which had been blown over, and was close to the edge of a creek. Another nest in the same vicinity was found with fresh eggs on May 5, 1890. Mr. Taverner records a nest found near Flint, Genesee county, May 30, 1905, and T. L. Hankinson found a nest with young June 2, 1895, in Ingham county.

The eggs are similar to those of the other Water-thrushes, creamy white, spotted with brown and lilac, the size, number and disposition of the markings being somewhat variable, but the eggs usually distinguishable from those of the Oven-bird, which they nevertheless resemble. They average .73 by .59 inches.

Much has been written about the song of this bird and it is difficult to exaggerate its power and beauty; nevertheless there is undoubtedly much individual variation. Mr. Chapman writes: "As a songster the Water-thrush is without a rival. His song is not to be compared with the clear-voiced carol of the Rose-breasted Grosbeak, the plaintive chant of the Field Sparrow, or the hymnlike melody of the true thrushes; it is of a different kind. It is the untameable spirit of the bird rendered in music. There is an almost fierce wildness in its ringing notes" (Handbook, p. 368).

In general habits all the water-thrushes are much alike. They spend most of the time on the ground in wet places and are most often seen running nimbly about the edges of pools, balancing for an instant on a stick or pebble, or walking deliberately along a slender branch or root, now disappearing in the dark cavity beneath a stump or log and again wading a few steps into the water to pick up some tempting morsel of aquatic life. All the time the body is swaying up and down with the characteristic wagging motion which suggests the sandpiper. During migration water-thrushes are often found about the edges of muddy pools in open fields and pastures, even associating with sandpipers and plover, but ordinarily they prefer water fringed with willows or other bushes, and during the nesting season are seldom seen in the open. The food consists mainly of aquatic insect larvæ, but insects and spiders of various kinds are eaten, as well as worms, crustaceans, snails and other mollusks, and to a lesser extent various seeds and small fruits.

TECHNICAL DESCRIPTION.

Adult: Very similar to the Small-billed Water-thrush, but upper parts lighter olive-brown; the line over the eye pure white, the under parts always distinctly buffy or brownish white rather than yellowish-white, and the spots and streaks broader and lighter colored (never darker) than the color of the upper parts; the buffy color most pronounced on the flanks, belly and under tail-coverts; chin and throat nearly white and often without any spots. Sexes alike.

Length 5.75 to 6.40 inches; wing 3 to 3.25; tail 2.10 to 2.30; culmen .50 to .56.

290. Kentucky Warbler. Oporornis formosus (*Wils.*). (677)

Synonyms: Sylvia formosa, Wils., 1811.—Myiodioctes formosus, Aud., 1839.—Geothlypis formosa, A. O. U. Check-list, 1886, and most subsequent authors.

The olive green back and bright yellow under parts, coupled with the black bar on the side of the head and neck and the yellow stripe over and behind the eye, mark this species clearly. There are no white marks on tail or wings.

Distribution.—Eastern United States, west to the Plains, breeding from the Gulf States north to southern New England and southern Michigan. In winter, West Indies, eastern Mexico, and Central America to Panama.

This beautiful warbler occurs in Michigan only as a rare straggler from the south. The northernmost record is by Dr. Atkins, who wrote Dr. Gibbs that he took a male at Locke, Ingham county, July 24, 1877, stating that at the time he shot it it kept in the top of a tamarack tree repeating its curious note "whit-ishee, whit-ishee."* So far as we can learn this specimen was never examined by any other ornithologist, and Dr. Atkin's statement that it was in the top of a tamarack tree throws at least a shadow of doubt on the record, since the bird is a ground warbler, frequenting rich damp woods where it runs about or walks much in the manner of the Ovenbird. According to Ridgway: "It lives altogether near the ground, making its artfully concealed nest among the low herbage and feeding in the undergrowth, the male uttering his pretty song from some old log or low bush. His song recalls that of the Cardinal, but is much weaker; its ordinary note is a soft *pchip*, somewhat like the common call of the Phoebe." Ridgway adds that "in its manners it is almost a counterpart of the Golden-crowned Thrush, but is altogether a more conspicuous bird, both on account of its brilliant plumage and the fact that it is more active."

So far as we can learn the only warrant for the statement that this species breeds in Michigan is the above record by Dr. Atkins on July 24. It seems at least very doubtful whether the bird is anything more than a straggler to the southern part of the state, and if it breeds the fact is yet to be proved. Aside from the Atkins specimen there appear to be but three positive records for the state. Jerome Trombley identified a Kentucky Warbler positively at Petersburg, May 4, 1886; J. Claire Wood took a male in high plumage in Gratiot township, Wayne county, May 6, 1906,† and kindly sent it to the writer for examination; and there is a specimen in a collection of mounted birds in Saline, Wayne county, which in all probability was taken in that immediate vicinity by a Mr. Van Duzer, now deceased. His wife writes under date of April 3, 1906: "In regard to the Kentucky Warbler which I have in my collection, I can positively say that it was not obtained by exchange or purchase, but my late husband collected it close to home." Dr. Gibbs of Kalamazoo was quite sure that in 1875 he secured a specimen of this rare warbler in immature plumage, but it spoiled before he had time to prepare it. This is doubtless the source of the record in Cook's Bulletin (Birds of Mich., 2d ed., 1893, page 136).

The Kentucky Warbler has been reported by one or two observers from the Upper Peninsula of Michigan, but no specimens have been taken and the reports are doubtless founded on mistaken identifications. The bird is very rare in southern Wisconsin, where, according to Kumlien and Hollister there are but seven records for sixty years (Birds of Wisconsin, p. 117.) Butler states that the most northern point which the Kentucky Warbler is known to have reached in Indiana is Gibson Station, where Mr. C. E. Aiken is said to have taken several specimens in May 1871 (Birds of Ind., 1897, 1086).

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*Forest and Stream, May 13, 1883.

†Auk, XXIII, 1906, 344.

The nest resembles that of the Maryland Yellowthroat, but is very carefully hidden, so that it is seldom found. It is placed invariably upon the ground, and the eggs are white or creamy white, speckled with brown. They average .72 by .56 inches.

TECHNICAL DESCRIPTION.

Adult male: Forehead and sides of head black, with a bright yellow stripe over and behind the eye; rest of upper parts, including wings and tail, olive-green; entire under parts clear bright yellow. Wings and tail unmarked with lighter patches. Female very similar, but the black head markings sometimes more or less obscured by gray edgings.

Length 5 to 5.85 inches; wing 2.55 to 2.80; tail 1.90 to 2.20.

291. Connecticut Warbler. Oporornis agilis (*Wils.*). (678)

Synonyms: Sylvia agilis, Wils., 1812.—Trichas agilis, Nutt., 1840.—Oporornis agilis, Baird, 1858.—Geothlypis agilis, A. O. U. Check-list, 1886.

The olive green back, wings and tail, without spots, ash-gray or blue-gray head and neck, and yellow belly, are common to this species and the Mourning Warbler, but the latter, when adult, always shows some black on the breast and has no white about the eye, while the Connecticut Warbler has no black on the breast and always has a white ring around the eye.

Distribution.—Eastern North America, breeding north of the United States (Manitoba and Ontario). Northern South America in winter.

This is one of our rarer warblers, seldom met with except during migration and then only by accident or after thorough and intelligent search. It appears to prefer tangled growths of weeds, briars and grasses on low ground, and in spring is seldom found far from such locations.

In its habits it is somewhat like the Maryland Yellow-throat, but is far less common and much more shy, so that it is seldom seen. Specimens have been taken in many parts of the state, from Wayne county, in the southeast, to Ontonagon county, in the extreme western part of the Upper Peninsula. At the latter place it is not unlikely that the species nests, for a female was taken in the Porcupine Mountains July 27, 1904, by Mr. Maclean, of the University of Michigan expedition, and this bird had the large bare space and thickened skin on the abdomen which is so characteristic of birds which have recently incubated. This female, moreover, was accompanied by young of the year. On August 1, in the same vicinity, a family of four was seen in a clearing by Mr. McCreary.

Like may of the warblers, this species seems to be much more common in autumn than in spring, and most of our records are for September and October. However, Mr. Covert states that in the spring of 1888 it was very common about Ann Arbor, where he secured about fifteen specimens. He calls it a very late arrival and says it seems to delight in wet days, singing most when the woods are dripping. In the spring of 1907 it again seemed to be quite common and N. A. Wood took two specimens on May 18, and two more on May 30.

Mr. Seton Thompson describes its song in Manitoba as suggested by the syllables "beecher-beecher-beecher-beecher-beecher-beecher. He states that it is somewhat like the song of the Ovenbird, but different in being of the same pitch throughout, instead of beginning in a whisper, and increasing the emphasis and strength with each pair of notes to the last (Birds of Manitoba, page 622). This writer found the nest at Duck Mountain, Manitoba, and describes it in the Auk, Vol. I, 1884, pp. 192-193.

It was composed of dry grass and sunken level with the surface of the ground. The eggs were four, creamy white, with a few spots of lilac-purple, brown, and black, and measured .75 by .56 inches.

There is little doubt that the Connecticut Warbler nests regularly in parts of Northern Michigan, but it is usually confused with the Mourning Warbler, which is far more plentiful. Thus records unsupported by specimens must be received with the greatest caution. Recent captures in the southeastern part of the state indicate that the bird is to be found more frequently than is generally supposed. Mr. P. A. Taverner, in his manuscript list of the birds of St. Clair county, says: "I do not think this bird as rare as is generally supposed, as I have taken one every year for the last six years wherever I have been. The finding of them seems to be more in knowing where to look and looking." Mr. N. A. Eddy, of Bay City, has two skins in his collection taken on Heisterman's Island, Saginaw Bay, September 2, 1889, and Mr. N. A. Wood found it common on Charity Island, Saginaw Bay, September 1, 1910. He says "I saw more in one day than in all my life before." Mr. S. E. White took two specimens on Mackinac Island, one August 30, 1889, and the other August 30, 1890. Mr. J. Claire Wood has secured one or more specimens near Detroit, and Mr. B. H. Swales gives a list of six or seven specimens taken in that vicinity in recent years (Wilson Bulletin, No. 53, 1905, p. 109). Peet records several seen on Isle Royale September 12, 1905. Apparently the first specimens taken in the state were one secured by Dr. H. A. Atkins at Locke, Ingham county, May 30, 1879, and one taken by C. W. Gunn in Ottawa county May 22, 1879. Others were taken near Kalamazoo on May 17, 1880, May 27, 1881 and May 28, 1883. A specimen was killed on Spectacle Reef Light, Lake Huron, October 3, 1893.

TECHNICAL DESCRIPTION.

Adult male: Head, neck, and chest ash-gray, darkest on the chest and top of head; a narrow white ring completely surrounding the eye; rest of upper parts, including wings and tail, olive-green; lower breast and belly pale yellow, sides shaded with olive-green. Adult female: Similar to the male, but top of head grayer, chin and throat soiled white or buffy, and breast pale grayish-brown; eye-ring brownish-white.

Length 5.20 to 6 inches; wing 2.65 to 3; tail 1.90 to 2.20.

292. Mourning Warbler. Oporornis philadelphia (*Wils.*). (679)

Synonyms: Black-throated Ground Warbler, Crape Warbler.—Sylvia philadelphia, Wilson, 1810.—Trichas philadelphia, Jardine, 1832.—Geothlypis philadelphia, Baird, 1858, and most subsequent writers.

Very similar to the Connecticut Warbler, but lacks the white eye-ring and has more or less black on the breast. See notes under Connecticut Warbler.

Distribution.—Eastern North America to the Plains, breeding from the mountainous portions of Pennsylvania, New England, New York, and northern Michigan northward. Central America and northern South America in winter.

A beautiful and not generally well known migrant throughout the whole state, and a not uncommon summer resident in its northern half. Many observers call it rare, but a good collector will have little difficulty in finding it in some numbers during the latter half of May and again in September and early October. It is one of the latest warblers to arrive in spring, Mr. Wood's earliest record in twenty-five years at Ann Arbor being May 3, 1883, and the average May 15, while in three years the arrivals were May 19, May 20 and May 27. Dr. Gibbs gives the first record for Kalamazoo county, a specimen taken by Mr. Syke, May 21, 1882, but his first records for Howard City, Montcalm county, are May 13, 1880, May 11, 1882 and May 20, 1883. He found them common if not abundant in Montcalm and Wexford counties. Specimens were killed on Michigan lighthouses as follows: Detroit River Light, May 15, 1886; Pt. Aux Barques Light, Lake Huron, May 12 and 13, 1883; Spectacle Reef Light, Lake Huron, May 31, 1892, May 22, 1893, August 23, 1887.

The Mourning Warbler is a decidedly rare bird east of the Alleghanies but seems to be fairly abundant as a nesting bird in parts of northern Michigan if not throughout. It is by no means confined to wet ground, but frequents thickets and brushy clearings. In such situations it may be found among the bushes, or singing from the top of a low tree, reminding one both in habits and song of the Maryland Yellowthroat, but being much more conspicuous. Dr. W. H. Dunham states that in Kalkaska county he has found it a common breeder. Under date of August 1, 1906, he writes "I have seen from one to four pairs in every old chopping I have visited all summer up to date. They were almost as common here this summer as in Marquette county, where I spent from June 25 to July 21 this year." It was found frequently in the Porcupine Mountains, Ontonagon county, by the University of Michigan expedition in 1904, and was evidently nesting, females accompanied by young barely able to fly being seen several times. Peet also records it at Isle Royale, Lake Superior, in July 1905. The writer found it nesting in some numbers at Munising, Alger county, July 6, 1903, and observed a female feeding young at Grand Marais, in the same county, a few days later. Mr. E. A. Doolittle states that in the summer of 1906 he found it a common breeder on Grand Island, Lake Superior, and came across three nests (between June 19 and July 12) containing eggs. Dr. W. H. Dunham found a nest in Kalkaska county June 7, 1902, "which was located at the edge of an old chopping, on the ground, and was shaded by vines commonly known as wild buckwheat. There were four fresh eggs."

Dr. Gibbs found the Mourning Warbler an abundant summer resident in Montcalm county from 1880 to 1884, and speaks of it as perhaps the most abundant species of the family in that county. Our southernmost summer record for the state was obtained by E. R. Kalmbach, who found two males in a swamp near Lansing, Ingham county, July 7, 1907. Both were in full song and undoubtedly had nests in the vicinity. One specimen was collected and its identification confirmed by the writer.

According to Ridgway: "The eggs are not separable from those of the Connecticut and Kentucky Warblers," that is, they are white or creamy white, speckled and spotted with brown, reddish brown and lilac gray. They average .71 by .54 inches.

The song is variously described by different writers as suggesting that of the Maryland Yellowthroat, the Kentucky Warbler, the Ovenbird and the Water-thrush. Mr. Walter Faxon describing the song in western Massachusetts says: "The song that I most often heard resembles the syllables thur-ree, thur-ree, thur-ree. A refrain consisting of three notes, with the accent upon the last, or of two notes with a strong accent on the first, the voice falling on the second, was sometimes appended. At other times the form of the song was quite different, consisting of but five notes, the penultimate note strongly accented, the last pitched on a lower key. The last two notes together are equal in time to one of the first three." Kumlien and Hollister (Birds of Wisconsin, p. 118) are of the opinion that "this species never breeds in Wisconsin, although the other [the Connecticut Warbler] does, quite the opposite of the case as usually given." This is contrary to the facts so far as observed in Michigan, where the Mourning Warbler is a common breeder in many localities, and the Connecticut a comparatively rare one.

TECHNICAL DESCRIPTION.

Adult male: Head, neck and chest ash-gray, more or less mixed with black on the breast, where it often becomes pure black; upper parts, including wings and tail, olive-green; lower breast and belly rich bright yellow, shaded with green on sides; no white eye-ring, and no light wing or tail markings. Female similar, but grayer on the head and breast, whiter on throat.

Length 4.90 to 5.75 inches; wing of male 2.30 to 2.55; tail 2 to 2.25.

293. Maryland Yellowthroat. Geothlypis trichas trichas (*Linn.*). (681)

Synonyms: Northern Maryland Yellowthroat, Northern Yellowthroat, Western Yellowthroat, Common Yellowthroat, Yellowthroat.—Turdus trichas, Linn., 1766.—Sylvia trichas, Vieill., 1807.—Geothlypis trichas, Baird, and most recent writers.—Sylvia marilandica, Wils., 1808.—Trichas marylandica, Nutt., 1840.—Trichas marilandica, Bonap., 1838, Aud., 1839 (part).—Geothlypis trichas brachidactyla, W. Palmer, 1900.

Plate LXII.

The bright yellow throat and breast and black mask or "domino," bordered behind by white or ashy white, are characteristic. The olive back, wings and tail, without spots, and the yellow under tail-coverts will make assurance doubly sure.

Distribution.—Eastern North America. Breeds in Canadian, Transition and Upper Austral Zones from North Dakota, northern Minnesota, northern Ontario and southern Labrador south to central Texas, northern parts of the Gulf States, and Virginia; winters from North Carolina and Louisiana to Florida, the Bahamas, Cuba, Jamaica, Guatemala and Costa Rica (A. O. U. Check-list, 1910).

Our common Yellow-throat is widely distributed over the state, and in most places fairly abundant as a summer resident. It nests commonly in Monroe, Wayne and St. Clair counties in the southeastern part of the state, was found during the nesting season on Neebish Island, St. Mary's River by Major Boies, was not uncommon in Ontonagon county during July and August, as recorded by the University of Michigan expedition in 1904, and it has been found in practically all the intervening territory wherever conditions are favorable. It is partial to wet ground, but it is not necessary that this should be of great extent. While it is found on the borders of the large marshes, and particularly on little islands in marshes and swamps, it is frequently met with near springs and brooklets on hillsides, and often in "cat-holes" in open fields, wherever a little water has made the ground too soft for cultivation. It is almost confined to the low growths next to the ground, being rarely seen amid the branches of trees, even during migration.

The Yellow-throat arrives from the south at about the same time as the majority of the warblers, the average date at Ann Arbor being given

Plate LXII. Maryland Yellowthroat.

From an original drawing by P. A. Taverner.

by Mr. Wood as May 10, and the earliest arrival as April 24, 1904. The migratory movement continues all through May, and specimens were killed on Pt. Aux Barques Light, Lake Huron, May 11, 1893, on Spectacle Reef Light May 19, 1893, May 22, 1890, May 23, 1897 and June 2, 1889. The southward migration occurs mostly in September, but there is doubtless considerable movement in August, while a few linger into October. A specimen was killed on Spectacle Reef Light October 3, 1893.

This is one of our most inquisitive warblers and so soon as its haunts are invaded it begins to utter its querulous or scolding note, which consists of a nasal or wiry *chip*, and it continues to call in this manner, coming closer and closer to the intruder, but often keeping entirely hidden, until very near, when it is likely to climb to the top of a low bush, or at least far enough up to get a view of its enemy, when it suddenly dives again into the grass and bushes.

The nest is a decidedly bulky structure, as a rule, and is most often placed in a tussock of grass or a tangle of vines and low shrubs, seldom more than a few inches above the ground, not infrequently directly upon it. Some writers state that the nest is occasionally roofed over, being globular, with the entrance through a hole in the side, but we have never seen such a nest in Michigan or elsewhere. It is built usually of grasses and various fibrous materials and lined with finer grasses and hairs. In central Michigan it is built the last of May or first of June; probably June 5 to 10 would cover the period when fresh eggs are most commonly found. Second sets are occasionally found in July, but we have been unable to prove that this species normally rears a second brood, the evidence seeming to show that it does not. The eggs are three to five, white, finely speckled with dark brown and black, occasionally marked with fine pen-scratches, and average .70 by .52 inches.

The song of the Yellow-throat is perfectly characteristic, yet no two writers describe it in the same way. Seton Thompson, in his Birds of Manitoba, speaks of it as like "rap-pittity, rap-pittity, rap-pittity, rap," and says that to the bramble-scratched follower it often seems to be calling loudly and plainly "what a pity, what a pity, what a pity, pit," or again "what's the matter, what's the matter, what's the matter, mat." Chapman writes it: "I beseech you, I beseech you, I beseech you, I beseech you" and others have used the words "wichity-wichity-wichity-wichity." Hoffmann says: "Three common forms are (a) weé-see-see, weé-see-see, weé-see-see, (b) wee-seé-ser, wee-seé-ser, wee-seé-ser, (c) wee-see-seé-see, wee-see-seé-see, wee-see-seé-see, wee-see-seé-see" (Guide, 1904, 104). Many observers testify to the fact that the Yellow-throat often rises to some little height in the air and sings a short warbling song unlike any of the notes already described. This song is sometimes uttered at a height of forty or fifty feet, but more often the bird only rises twelve or fifteen feet and hovers while singing, somewhat in the manner of the Chat. We have also heard this song repeatedly at night.

The Yellow-throat is entirely innocent of any harm to the agriculturist, and its insect-eating must confer a direct benefit, although from the character of the places frequented this cannot be considered very important. Prof. Forbes examined stomachs of two Yellow-throats killed in an Illinois orchard, where canker-worms were stripping the trees, and found that caterpillars made up four-fifths of their food, about half of them being canker-worms, while there was eight percent of beetles, five percent of small hemiptera and four percent of gnats.

TECHNICAL DESCRIPTION.

Adult male: A broad "mask" of deep black covering the forehead and sides of head and neck, including the eye, and bounded posteriorly by a narrow edging of bluish-white or gray; rest of upper parts, including wings and tail, olive-green, grayer in front, greenish on rump and upper tail-coverts; chin, throat, and breast bright yellow, fading to yellowish white on the belly, and becoming brownish on sides and flanks; under tail-coverts bright yellow. Female without any black or white on head; olive green above; grayish on side of head; throat and breast pale yellow; belly and sides brownish white; under tail-coverts, buffy.

Length of male 4.40 to 5.75 inches; wing 2.05 to 2.20; tail 1.90 to 2. Female somewhat smaller.

294. Yellow-breasted Chat. Icteria virens virens (*Linn.*). (683)

Synonyms: Chat, Common Chat, Yellow Chat.—Turdus virens, Linn., 1758.—Icteria viridis, Bonap., 1825, Nutt., 1832, Aud., 1834.

Plate LXIII.

Largest of the warblers, almost as large as the Catbird, and recognizable at a glance by the olive-green or olive-gray back, black stripe from bill to eye, bordered above and below by white, and especially by the rich golden yellow throat and breast and abruptly white belly. Wings and tail are like the back and unspotted.

Distribution.—Eastern United States to the Plains, breeding north to Ontario and southern New England; south in winter to eastern Mexico, Guatemala, Nicaragua, and Costa Rica.

Making all due allowance for the peculiar habits of the Chat and the character of the country frequented, it is nevertheless certain that it is not a common bird anywhere in the state. It seems to be entirely confined to that part of Michigan south of 43°, and practically to the three lower tiers of counties. The reports seem to show that it is a regular but by no means a common visitor to Monroe, Washtenaw and Wayne counties, and probably also to Hillsdale, Branch and St. Joseph counties, and it has been taken, or at least satisfactorily seen, in half a dozen other counties.

The northernmost record seems to be that of Dr. Atkins, who states that at Locke, Ingham county, it was first taken August 11, 1876 and was common until October 2. This record is decidedly puzzling, since the period indicated is precisely that during which the Chat is practically silent, and aside from this statement of Dr. Atkins we have no record of the bird in the state in the fall. Careful search for this species in the vicinity of Lansing, Ingham county, was unrewarded for nearly a dozen years, but on May 21, 1905, at Chandler's Marsh, about two miles north of the Agricultural College, the writer an B. H. Swales heard one of these birds several times, and later in the day about a mile west of Park Lake, Clinton county a second one was heard. Neither of these was obtained or even seen, but as both observers are perfectly familiar with the notes of the birds there can hardly have been any mistake.

P. A. Taverner states that in June 1894, Mr. A. B. Covert, Dr. Wolcott and himself collected half a dozen Chats in a limited locality near Ann Arbor, and he was informed that Mr. Covert and Professor Worcester took the eggs of the Chat in the same locality a year or two later. At Pearl Beach, St. Clair county, June 5, 1904, Mr. Taverner caught a glimpse

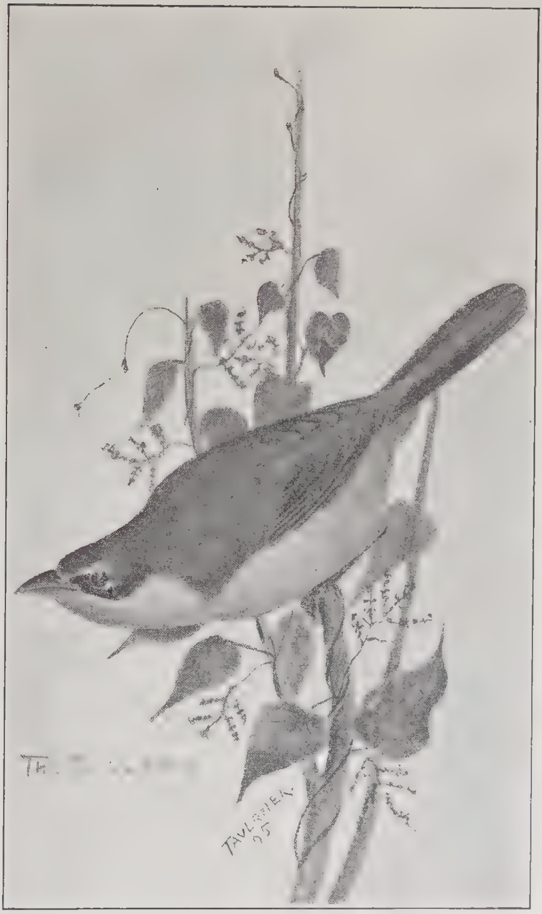

Plate LXIII. Yellow breasted Chat.

Courtesy of P. A. Taverner.

of a Chat, and on September 18, near Detroit, he heard several times a bird which he identified pretty certainly as a Chat. Mr. Norman A. Wood writes that on May 16, 1906, he found at least one pair of Chats in Steere's swamp near Ann Arbor. This swamp is in the old Huron River drainage channel and also connects with the Wabash and other drainage systems. Mr. Wood states that this was the first Chat he had ever seen alive, although he had been on the watch for them for the last ten years in this same swamp. On June 28, 1909, Mr. Wood found two pairs of Chats in the same swamp, and has no doubt they bred there. Mr. Covert took a male at Ann Arbor May 21, 1879, and there is a specimen in the Agricultural College museum collected by A. H. Boies in Hillsdale county in June 1890.

The first eggs taken in the state, so far as we know, are a set of four taken by Jerome Trombley in Summerfield, Monroe county, May 26, 1877. These are now in the Agricultural College collection. Subsequently Mr. Trombley took at least three more sets in one year, and found nests during two other seasons, but he always considered the bird decidedly rare in that vicinity, and of late years has not found it at all. On the other hand, Mr. W. A. Davidson found a pair breeding near Detroit, May 29, 1898, and Mr. Chas. E. Wisner secured a set of eggs at Grosse Point Farms, Wayne county, May 30, 1903. Mr. Swales, who furnishes these notes, states that the bird was not secured in either instance. More recently still (June 1905) Swales and Taverner found several Chats near Detroit and heard others, but did not secure specimens, and J. Claire Wood also found them near Detroit on May 16 and 20 and June 6 and 17, all in 1906. The chat has also been found nesting on the north shore of Lake Erie near Point Pelee, Ontario, about twenty miles east of Detroit. These facts show that the bird is quite erratic in its choice of a home and may be fairly common in a region one season and almost absent at another. It has been claimed that the species has become more abundant, or at least has pushed farther north, during the last decade or two, but we find no records which tend to establish this fact.

Our data are too meager to give us much information as to time of migration, but the Chat doubtless arrives in Michigan in the middle of May or somewhat earlier, and ordinarily remains well into September. Its favorite haunts are thickets, briar patches and cut-over lands on wet ground, and it is rarely found far from such places. It does frequent dry hillsides at some seasons, if these furnish abundant thickets of dense underbrush, but these usually are at no great distance from swamps, spring or streams.

The Chat is noted for its remarkable success in evading observation, so that it may be fairly abundant in a locality, and one may be constantly within hearing of its varied and remarkable notes, and yet almost never catch a glimpse of the bird. Nevertheless at times it rises recklessly into the air to a height of many yards and then hovers, flutters and drops back into the underbrush, at the same time uttering a medley of jerky notes accompanied by singular contortions of the body, the legs dangling in an ungainly manner and the bird apparently utterly oblivious to its surroundings. More rarely still, if an observer remains well hidden, he may see an inquisitive Chat climb to the top of a small bush, or even into the branches of a low tree, in the manner of the Maryland Yellow-throat, and from a distance it may be seen singing from such an open perch. Usually, however, its song, or the peculiar collection of notes which does duty for such, is uttered only from the recesses of some thicket where the bird is entirely invisible. Mr. Eugene Bicknell says "This eccentric bird is perhaps our only species which regularly sings at night. They sing both when the moon is bright and when the night is clear and dark; their odd notes interrupting the midnight stillness with peculiar effect."

The song is very difficult to describe. Dr. Wheaton says of it "If he discovers the approach of a human being, even at a considerable distance, he prepares to resent the intrusion; and giving three short, loud whistles, very low in tone as a warning, he advances toward him, all the while careful that he should be heard and not seen. Then follows a medley of sputtering, cackling, whispering and scolding notes, frequently interspersed with loud whistles, and continued as the bird runs, hops, or flies for the deepest thicket, with a pertinacity which knows no fatigue. * * * Sometimes he may be surprised as he sings in the upper branches of a tree. He then sits motionless, continuing his song as if unaware of any intrusion upon his privacy, and so resonant and varying are his notes that they confuse the ear as to the spot from which they come. It is to these rapid and sonorous notes, quick motions or perfect quiet, and harmonious surroundings, that he owes the reputation for ventriloquism which he has obtained; and it may be said of his reputation for mimicry that he has no need to borrow notes from any other bird and does not knowingly do so."

The nest is placed invariably in a low bush or mass of briers and vines and consists mainly of grasses and leaves, lined with fine grass, roots and sometimes with hair. The eggs are three to five, pure white or pinkish-white, spotted with brown and gray, and average .89 by .67 inches. Probably in Michigan but one brood is reared in the season.

TECHNICAL DESCRIPTION.

Adult male: Upper parts, including wings and tail, olive-green, somewhat grayer on crown, brownish on wings and tail; chin, throat, and breast golden yellow of varying intensity; belly and under tail-coverts white; flanks brownish; streak from nostril to eye, another from base of lower mandible along side of throat, and eye-ring, white; lores and small space below eye black; wings and tail without spots or bars. Sexes almost alike, female a little duller.

Length 6.75 to 7.50 inches; wing 2.90 to 3.20; tail 2.90 to 3.35.

295. Hooded Warbler. Wilsonia citrina (*Bodd.*). (684)

Synonyms: Hooded Flycatching Warbler, Black-headed Warbler, Mitred Warbler.—Muscicapa citrina, Bodd.—Sylvia mitrata, Nutt., 1832, Aud., 1834.—Sylvania mitrata, Nutt., 1840, A. O. U. Check-list, 1886.—Myiodioctes mitrata, Aud., 1841.—Myiodioctes mitratus of most other authors.

The adult male is one of our most striking warblers, the entire head and neck being rich velvet black except for a broad band of brilliant yellow which covers the forehead, encloses the eyes, and extends downward over the cheeks. The black ends abruptly on the chest, the remaining lower parts being brilliant gamboge yellow; the back, wings and tail are bright olive-green, the wings without bars but the two outer pairs of tail-feathers are largely white.

Distribution.—Eastern United States, west to the Plains, north and east to southern Michigan, southern Ontario, western and southwestern New York, and southern New England. Breeds from the Gulf of Mexico northward. In winter, West Indies, eastern Mexico, and Central America to Panama.

This is one of the Michigan warblers about which we know comparatively little, yet it certainly occurs as a migrant over the southern half of the state and very possibly nests wherever found. It seems to be nowhere abundant, yet its habits are such that unless carefully searched for it seldom would be found. During migration it is perhaps less careful to keep itself concealed and thus it is captured occasionally, but for its summer residence it prefers the thick undergrowth of heavy moist woodlands where the shade is so deep and the growth so dense that one unfamiliar with the bird's song might never suspect its presence. In such locations the nest is placed, and according to Dr. Gibbs the bird formerly nested in considerable numbers in Kalamazoo county and probably still nests there. He states that he found at least a dozen nests, but only by the utmost patience and the hardest kind of work.

A nest of three eggs taken in Kalamazoo county in June 1878 was in a beech bush in high woods, the nest being only two and one-half feet above the ground. Another set of two eggs in the same locality was taken June 10, 1876 from a nest in a small bush three feet above the ground. Dr. Gibbs also found the bird in Kent and Ottawa counties on June 5, 6 and 10, 1878, and states that it is common there and undoubtedly breeds; he also observed it in some numbers in Montcalm and Newaygo counties in 1881, 1882 and 1883. In Ingham county this appears to be one of our rare warblers and we have met with it but once in the past ten years. Mr. Purdy states that he has often seen it in spring at Plymouth, Wayne county, but Battle Creek, Manchester and Detroit observers consider it a rare species, and according to B. H. Swales it has never been recorded from St. Clair county. In Monroe county, Mr. Trombley of Petersburg states that it was plentiful forty years ago, but appears to be entirely absent now. At Macatawa, Ottawa county, Prof. Frank Smith found a Hooded Warbler feeding a Cowbird, August 12, 1905, and a few days later and a half mile distant he found another bird of the same species caring for two young Cowbirds. Undoubtedly the bird is very local and further investigation may show that it has a much wider distribution in the state than the foregoing records seem to indicate.

Nehrling describes the nest of this species in southwestern Missouri as follows: "It is usually placed in a snowberry bush only one or two feet above the ground. It is well hidden among the dense foliage and branches of these peculiar bushes and is built of fine bark-strips, skeleton leaves, catkins from hickory and oak trees, and fine grasses, all compactly woven together with spider webs. The lining consists of grapevine bark; occasionally it is lined with horse or cattle hair throughout. These nests are not so beautiful as those found in the kalmia and swamp honeysuckle thickets of the east."

Langille describes the song as follows: "The common and familiar song of the Hooded Warbler is 'che-reek, che-reek, che-reek, chi-di-ee,' the first three notes with a loud bell-like ring, and the rest in very much accelerated time, and with a falling inflection. * * * In addition to its alarm note, a sharp whistling or metallic chip which is very clearly characterized, the Hooded Warbler has two distinct songs as different as if coming from different species" (Bull. Nutt. Orn. Club, VII, 1882, 119).

The eggs are three or four, white or buffy white, speckled or spotted at the larger end with reddish-brown, lilac-gray, and usually a few pen-scratches of black. They average .70 by .53 inches.

TECHNICAL DESCRIPTION.

Adult male: Forehead and sides of head, including eye-region and ear-coverts, bright yellow; rest of head and neck deep black; rest of upper parts bright olive-green; rest of under parts bright yellow, paler on under tail-coverts; wings unmarked; outer three pairs of tail-feathers with most of inner webs white. Female similar, but with much less black, the throat often entirely yellow, the black "hood" usually obscured more or less above by greenish tips of the feathers, sometimes lacking altogether.

Length 5 to 5.70 inches; wing 2.50 to 2.75; tail 2.20 to 2.40.

296. Wilson's Black-cap. Wilsonia pusilla pusilla (*Wilson*). (685)

Synonyms: Wilson's Flycatcher, Wilson's Flycatching Warbler, Wilson's Black-capped Flycatching Warbler, Wilson's Warbler, Black-capped Flycatching Warbler, Black-capped Warbler, Blackcap.—Muscicapa pusilla, Wils., 1811.—Wilsonia pusilla, Bonap., 1838, A. O. U. Committee, 1899.—Sylvania pusilla, Nutt., 1840.—Myiodioctes pusillus, Baird, 1845, and many other writers.

Mainly yellow, brightest and clearest below, more greenish or decidedly olive-green above, the crown with a satiny black patch which is always present in the adult male, but of which there may be only traces in the female and young. There are stiff bristles about the base of the bill as in typical flycatchers.

Distribution. Eastern North America, west to and including the Rocky Mountains, north to Labrador, Hudson Bay Territory and Alaska. Breeds chiefly north of the United States, migrating south to eastern Mexico and Central America.

Wilson's Blackcap seems to be a rare warbler over most of Michigan, but occurs during migration in small numbers everywhere. It would seem to be least common in the southeastern part of the state, where several good observers have failed to find it at all and few have ever found it abundant. In the central part of the state and along the Lake Michigan border it is less uncommon, yet it is everywhere regarded as one of the rarer warblers.

It is one of the latest species to arrive from the south, reaching our southern counties from the 10th to the 20th of May, in average seasons, and passing rapidly northward to its nesting grounds beyond our limits. While with us it frequents shrubbery and the lower branches of trees, being rarely seen at any height and most often among blossoming shrubs within five or six feet of the ground. It is by no means shy and usually permits a close approach, so that identification is possible without shooting. Occasionally it is seen in little parties of three to six, but is more often found singly or in pairs, or perhaps most often associated with the Canadian Warbler, Blackpoll, Mourning Warbler, and other late migrants. A specimen was killed on Spectacle Reef Light, Lake Huron, June 2, 1889, and another August 23, 1887, while one struck Big Sable Light, Lake Superior June 6, 1894. Dr. Gibbs records one taken in Kalamazoo county, May 16, 1875, and another September 9, 1877, and Leon J. Cole took specimens at Spring Lake, Ottawa county, August 24, 1896. Other records are Grand Rapids, May 19 and 22, 1890 (S. E. White); Wayne county May 20, 1905 (P. A. Taverner); Mackinac Island, August 26 and 30, 1889 (S. E. White); Ingham county, May 18, 1900 (W. T. Shaw). At Ann Arbor N. A. Wood saw fifteen or more on May 28, 1907, and in Wayne county, J. Claire Wood found it tolerably common from May 15 to 29, 1909.

It is not impossible that the bird nests in the northernmost parts of the state, but we have no record of such nesting and it is not probable. It was found only as a migrant on Isle Royale, Lake Superior, where a single specimen was taken August 31, and a second on September 5, 1905.

The nest and eggs are still rarities in collections. The nest is placed invariably on the ground, usually in wet woods, and often sunken deeply in the moss and even more or less roofed over, so as to be difficult to find. The eggs are usually four, white or creamy white, speckled with brown and lavender or gray, and average .60 by .48 inches.

In its habits this bird somewhat resembles the flycatchers and the warblers, but on the whole does not seem to be so expert in catching winged insects as one might infer from its structure.

We find no satisfactory description of its song, which is said to resemble that of the Yellow Warbler carelessly and imperfectly rendered.

TECHNICAL DESCRIPTION.

Adult male: Top of head satiny black; rest of upper parts, including wings and tail, olive-green; forehead and entire under parts bright yellow, this color blending gradually with the color of the upper parts and the sides of the neck; wings and tail without markings. Female similar, but with the black cap often obscure, sometimes entirely wanting. Length 4.25 to 5.10 inches; wing 2.15 to 2.35; tail 2.05 to 2.25.

297. Canada Warbler. Wilsonia canadensis (*Linn.*). (686)

Synonyms: Canadian Flycatching Warbler, Canadian Warbler, Canada Flycatcher, Speckled Canada Warbler, Necklaced Warbler.—Muscicapa canadensis, Linn., 1766.—Myiodioctes canadensis, Aud., 1839.—Sylvania canadensis, Ridgw., 1885, and many others.

Upper parts, including wings and tail, bluish gray and without spots or bars except that the crown and forehead are streaked with black; the under parts bright yellow except for a broad band or necklace of black spots across the chest, extending on either side to the eye. The female is similar but shows no clear black, the necklace being of ashy spots and less extensive.

Distribution.—Eastern North America, west to the Plains, and north to Newfoundland, southern Labrador, and Lake Winnipeg; south in winter to Central America and northern South America. Breeds from the higher parts of the Alleghanies and the more elevated parts of southern New York and southern New England northward.

This beautiful warbler is a common migrant, both spring and fall, over the entire state and a not uncommon summer resident in favorable localities in its northern half.

It arrives from the south from May 10 to 20 in the southern counties, and a week or ten days later at the north. At Petersburg Mr. Trombley's earliest record is May 10, 1894, while O. B. Warren recorded it the same season at Palmer, Marquette county, June 3. At Ann Arbor the earliest record for twenty-five years, is May 1, 1888, the average being May 11 (Norman A. Wood). Specimens were killed on Spectacle Reef Light, Lake Huron, May 15, 1891 and May 28, 1892. The southward movement appears to begin early in August, but the species is fairly common from August 20 to the last of September, although the larger number move southward before the middle of September. During migration it may be found almost anywhere, but is rather more partial to the lower growths than the heavy woodlands, and is not often seen at any great height.

Its song is loud, clear and characteristic, but not readily described so as to be recognizable. Seton Thompson writes it "rup-it-che, rup-it-che, rup-it-chitt-it-lit." It is a very active bird, constantly catching insects, sometimes from twigs and leaves, but often also on the wing.

Throughout the northern half of the state it is by no means uncommon during the summer, and it breeds abundantly in suitable places. O. B. Warren states that it is a common nester in Marquette county, and S. E. White found it a common resident on Mackinac Island in 1890 and 1891, where "its loud song was heard in every patch of evergreens, and the young birds left the nest from July 2 to July 8." Widmann found it near Petoskey in Emmet county, feeding young July 20, 1901, and Mr. Newell A. Eddy took a nest and four eggs near Bay City, Bay county, June 2, 1885. Members of the University of Michigan expedition to Ontonagon county noted the bird frequently in July, and on July 13 one with an insect in its bill, apparently feeding young, was noted. On Isle Royale, the following summer, similar evidence of nesting was obtained. The writer found it fairly common on Beaver Island, Charlevoix county, and at Marquette, Munising and Grand Marais, in July 1903. It is also one of the abundant breeding warblers on Grand Island, Lake Superior, according to Mr. E. A. Doolittle.

The nest is said to be placed on the ground usually, and to be similar to that of the preceding species, Wilson's Blackcap. Near Listowel, Ontario, Mr. Kells found the Canadian Warbler breeding in low damp woodlands and the nest placed "in cavities of upturned roots of trees, and in the depressions in banks near streams of water" (McIlwraith, Birds of Ontario, 1894, 383). Mr. E. S. Currier, however, near Leach Lake, Minnesota, found nests differently placed. He says: "In 1902 I saw only two nests, but in 1903 I saw several. The nest seen in 1902 was placed in a clump of long dead grass, and almost on the ground after the manner of a Yellow-throat. It was composed entirely of long dry grass without any dead leaves, while those seen in 1903 were built principally of long dead leaves. The other nests varied considerably in situations, most of them being several inches above the ground, in low growths—one at least ten inches up. One nest seen in 1903 was placed on the ground at the side of a stock path in a dense growth of wild currants, and was the only one completely hidden. The number of eggs laid was usually four, and in only one case did I see five" (Auk, XXI, 1904, 43). Ridgway describes the eggs as colored like those of the Hooded Warbler, that is, white or buffy white, speckled with reddish brown and lilac-gray, and averaging .68 by .51 inches.

TECHNICAL DESCRIPTION.

Adult male: Upper parts mostly bluish-ash, the feathers of the forehead and crown with black centers, the forehead often entirely black; lores, incomplete ring around the the eye, and most of the under parts, bright yellow; a black line running from the base of the bill along the sides of the throat and joining a broad belt of black spots and streaks which encircles the breast like a necklace; wings and tail unmarked; under tail-coverts white. Female similar, but with little or no black, the forehead being brownish or grayish, but slightly spotted, and the spots forming the necklace across the breast sparse and ashy.

Length 5 to 5.75 inches; wing 2.50 to 2.65; tail 2.20 to 2.40.

298. Redstart. Setophaga ruticilla (*Linn.*). (687)

Synonyms: American Redstart, Redstart Warbler, Redstart Flycatcher, Fire-tail. - Motacilla ruticilla, Linn., 1758. —Muscicapa ruticilla, Bodd., 1783.—Septohaga ruticilla of most authors.

Figures 142, 143.

The male in full plumage is unmistakable, the back, head, neck and upper breast being glossy blue-black, and the sides of the breast, a large patch in each wing, and the basal half of the tail, brilliant orange-red or flame color, while the lower breast and belly are white. The female is entirely different, the black being replaced by grayish-olive above and by white below, and the flame color replaced by lemon-yellow.

Distribution.—North America, north to Ft. Simpson, west regularly to the Great Basin, breeding from the middle portions of the United States northward. In winter, the West Indies, southern Mexico, Central America and northern South America.

This handsome little warbler is an abundant migrant throughout the state and occurs also as a summer resident in suitable places everywhere. Possibly it nests rather more freely in the central and southern parts of the state than at the north, yet Mr. S. E. White states that it occurred in amazing numbers on Mackinac Island during summer, and the writer found it in large numbers on Beaver Island, Lake Michigan, as well as everywhere along the south shore of Lake Superior from Marquette to the Sault. In many parts of the state it exceeds the Yellow Warbler in numbers, and perhaps has equal claim to be considered on the whole the most abundant species of warbler throughout the state.

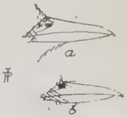

Fig. 142. Oven-bird (a). Red-start (b).

It arrives from the south rather early, Mr. Trombley recording it as early as April 23 and April 24 in different seasons, although ordinarily it does not reach Monroe county until about the first of May. At Ann Arbor Mr. Wood gives the earliest arrival in twenty-five years as April 5, 1903, the average being May 6. Among more than a score of specimens from Michigan lighthouses the majority of spring records fall between May 11 and May 28, with a single record at Spectacle Reef Light, Lake Huron, June 2, 1891. One was killed on Big Sable Light, Lake Superior, May 19, 1887 and another June 6, 1894. The autumn records at Spectacle Reef Light range from September 16 to October 3, but the southward migration certainly begins long before the middle of September, often in August.

Nesting begins in the southern counties from the middle to the end of May, and nests with eggs appear to be most abundant during the first week in June, yet many eggs are found late in June and occasionally even early in July, though the evidence of two broods is not complete.

The nests vary much in location, but are very rarely more than twenty feet from the ground, the great majority not even ten feet up. They are built of grasses, strips of bark, and various hemp-like threads, thoroughly interwoven, often held together by spiders' webs and caterpillars' silk, and commonly lined with fine grass and sometimes a few horse hairs. The nest is seldom bulky, but is usually compact and well made, deeply hollowed and quite durable. It is sometimes found in the fork of a horizontal branch, but usually in the upright crotch of a small tree or large bush, where it is firmly seated but seldom well concealed. As a result the bird is very frequently victimized by the Cowbird, and an immense number of nests must be deserted each year on this account. This fact alone is probably sufficient to account for the large number of nests found late in June and early in July.

The eggs are three to five, but most often four, white, greenish-white or grayish-white, speckled with brown and lilac, and average .63 by 48 inches. There is much variation in the ground color and the size of the spots, so that in a dozen sets of eggs no two may resemble each other closely.

This is one of the most restless and active of our warblers, seldom quiet for a moment, but always flitting about, snapping at insects on the wing, opening and closing the tail, spreading the wings and generally making itself conspicuous.

According to Audubon: "Its pleasing notes resemble the sounds 'teetee-whee, teetee-whee,' with sometimes a different note equally clear which may be expressed by the syllables 'wizz-wizz-wizz.'" Chapman writes the song "clung, clung, chee; ser-wee-swee, swee-e-e." Like the song of most other warblers the Redstart's is perfectly characteristic, but unless one has an unusual ear he will often mistake it for the song of some other warbler, at least at the beginning of each season, before he has refreshed his memory with new songs.

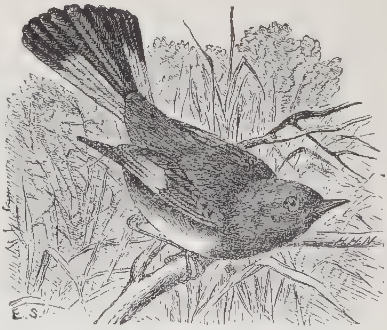

Fig. 143. Redstart. From Baird, Brewer & Ridgway's North American Birds. Little, Brown & Co.

The food of the Redstart resembles that of the other warblers of this group, consisting mainly of insects, with only an occasional berry or seed. That it is eminently beneficial cannot for a moment be doubted by any one who has watched the bird for any length of time in an orchard or grove. The number of insects taken is simply astonishing, and since the bird is one of our very common species its work in behalf of the fruit grower is of the utmost importance.

The Redstart is by no means confined to any one kind of woodland, but seems to be more common among deciduous growths than among evergreens, although by no means rare in mixed woods with a heavy sprinkling of spruce and pine. It more often nests, however, in somewhat heavy woods, where oaks, poplars, maples and similar trees are scattered here and there, with an abundance of horn-beam, flowering dogwood and other small trees. It neither seeks nor avoids swampy ground, but is rarely found in mere thickets in open country, or on the bushy islands in marshes, at least during the nesting season. During migration the bird may be found almost anywhere.

TECHNICAL DESCRIPTION.

Adult male: Head and neck all around, upper breast, and entire upper parts, deep black; breast and sides orange red, the rest of the under parts white, more or less streaked with black; basal half of most of the wing and tail-feathers orange, remainder black; bill and feet black. Female entirely different; the black of the male replaced above by grayish-olive, and below by white; the red of the male replaced by yellow, usually pale. Young males resemble the females, but are variously intermediate, the yellow often tinged with orange; probably they do not acquire the full plumage until the second or third year Length 4.75 to 5.75 inches; wing 2.40 to 2.55; tail 2.30 to 2.45.

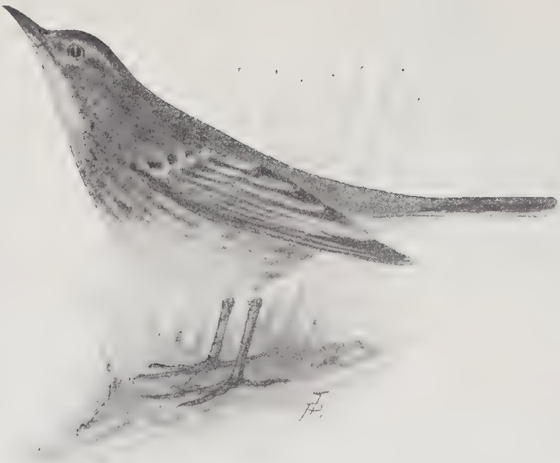

Plate LXIV. Titlark.

From an original drawing by P. A. Taverner.

Family 64. MOTACILLIDÆ. Wagtails.

Represented in Michigan by a single species, the Titlark.

299. Titlark. Anthus rubescens (*Tunstall*). (697)

Synonyms: Pipit, American Pipit, American Titlark, Prairie Titlark, Hudsonian Wagtail.—Alauda rubescens, Tunstall, 1771.—Alauda pensilvanica, Lath., 1787.—Anthus pensylvanicus, Thien., 1849, and many others.—Anthus ludovicianus, Licht., 1823, and most subsequent authors until 1884.—Anthus pensilvanicus, Stejn., 1884, A. O. U. Check-list, 1886, and later authors.

Plate LXIV.

A slender, active and inconspicuous little bird, commonly found in scattered flocks on the ground in open wet places in spring and fall; brownish gray above and creamy or buffy-white below, streaked with brownish black on breast and sides, and with two outer pairs of tail-feathers showing much white. The bill is slender like a warbler's, but the claw of the hind toe is longer than any Warbler's—as long at least as the toe itself.

Distribution.—North America at large, breeding in the higher parts of the Rocky Mountains and in sub-arctic districts, and wintering in the Gulf States, Mexico and Central America.

The Titlark is a common migrant, spring and fall, in most parts of the state, but appears to be but little known to the average observer. Doubtless every snipe hunter and most duck hunters are perfectly familiar with the bird itself without knowing its name.

It arrives from the south early in May, the earliest record given by Mr. Wood at Ann Arbor being May 4, 1893, and its period of greatest abundance in the spring is from that time until about May 15, when it passes northward beyond our limits. It reappears in the fall about the middle of September and remains until the ground freezes in November. Mr. Swales states that near Detroit it sometimes appears in large flocks in April and October, but is seldom noted later than November first. A single specimen was killed on Spectacle Reef Light, Lake Huron, September 23, 1889.

It confines itself to open country entirely, showing a marked preference for wet fields and bogs, especially such as are frequented by Wilson's Snipe. In autumn it is often seen, however, on comparatively dry plowed ground as well as in upland pastures and stubble fields. Usually it occurs in scattered flocks, from a dozen to fifty individuals being distributed over a space of a dozen acres, and when one is started several take flight, but even when fifty are on the wing they never collect into a solid flock, but fly in extended order. When feeding the birds run about rapidly on the ground, very much like sandpipers, and tilt and flirt the tail much like the water-thrushes and some shore birds. When flushed they rise very quickly to a considerable height, mounting by great leaps with their powerful wings, and constantly uttering their sharp double-syllabled call which gives the bird its name of "Pipit." We do not recall ever seeing one alight on a bush or tree and they seldom make use of a wire or fence-post.

The food appears to consist mainly of worms, insects and such other animal food as can be found in damp places, freely mixed with seeds of various kinds. The bird certainly does no harm and presumably does much good to the agriculturist, but its stay is so short and its numbers in any one locality so small that it probably is not an economic factor of any great importance.

The Titlark nests only in the far north or on the elevated meadows of high mountains. It is one of the abundant nesting birds of Labrador and part of the Hudson Bay region. The nest is always placed on the ground, built of grasses, weed-stalks and similar materials, and the eggs are four to six, so thickly speckled with brown as to show almost no ground color. They average .78 by .57 inches.

TECHNICAL DESCRIPTION.

Adult: Brownish-gray above, sometimes with darker streaks which are most distinct on the back; wings and tail brownish-black with light gray edgings, the wings with two brownish-gray bars; outer tail-feathers with terminal half white, next pair white-tipped; a white or buffy line over the eye; under parts dull grayish-buff in autumn, sometimes clear light cinnamon in late spring, usually with indistinct dark streaks on sides and upper breast.

Length 6 to 7 inches; wing 3.20 to 3.50; tail 2.65 to 2.85.

Family 66. MIMIDÆ. Thrashers, Mockingbirds, etc.

The three species occurring in Michigan may be separated as follows:

KEY TO SPECIES.

A. With much pure white in wings and tail. Mockingbird. No. 300.
AA. With little or no white in wings or tail. B, BB.
    B. Upper parts rust brown; breast thickly streaked with blackish. Brown Thrasher. No. 302.
    BB. Upper parts mainly slate color (crown black); breast not streaked. Catbird. No. 301.

300. Mockingbird. Mimus polyglottos polyglottos (*Linn.*). (703)

Synonyms: Mocking Thrush, Mimic Thrush.—Turdus polyglottos, Linn., 1758.—Turdus polyglottus, Wils., 1810, Aud., 1831, Nutt., 1832. -Mimus polyglottus or polyglottos of most authors.

Larger than a Catbird (which it resembles in shape), and smaller than a Robin, it may be known by the ashy-gray upper parts and soiled white lower parts, the wing black, with a large white patch, and the tail similar, the outer feathers mostly white and the others white-tipped. Could be confounded only with a shrike, but the shrikes have the bill hooked like a hawk's and a broad black bar on the side of the head.

Distribution.—United States, south into Mexico. Rare, and of irregular distribution from Maryland northward to Massachusetts, and north of southern Ohio, Colorado, and southern California. Bahamas.

The Mockingbird is a rare summer visitor to southern Michigan, having been reported perhaps a dozen times in the last twenty years. Several of these records are undoubtedly based on escaped cage birds, but there is no question that wild birds have been taken occasionally. Dr. Gibbs states that D. D. Hughes records the taking of a male in Marshall, Calhoun county, June 2, 1870 by Sid Van Horn. It had been observed for two or three days and may have been an escaped bird. Stockwell's Forest and Stream list (Vol. VIII, p. 241), states that the Mockingbird is very common in the southern part of Michigan and is occasionally seen as far north as Sanilac county. The first part of this statement is certainly not true at present, and we have been unable to verify the record for Sanilac county. Covert records the capture of a male at Ann Arbor, Washtenaw county, May 7, 1888, but believes it to have been an escaped cage bird. It is included in Fox's manuscript list of birds found about Detroit (about 1853), and in Bela Hubbard's "Memorials of a Half Century" (1888, p. 310), it is said to be "seen, though but rarely." The most recent report of this species comes from Mr. Walter M. Wolfe of Parkville, Missouri, who states that while spending the summer (of 1906) near Beulah, Benzie county, Michigan, he saw and heard a Mockingbird on August 15. He further states that Mr. Hollenbeck told him that a pair of Mockingbirds built near his house the previous year (1905), but that he had seen nothing of them since. Mr. Wolfe, being perfectly familiar with the bird in Missouri, could hardly be mistaken in the bird which he saw. The Mockingbird has been recorded several times from Ontario, McIlwraith recording a pair which spent the summer of 1883 near Hamilton, and quoting the record of one taken by Mr. Sandis, at Chatham in 1860. Mr. James H. Fleming also records taking a male at Point Pelee, Essex county, Ontario, May 20, 1906 (Auk, XXIII, 1906, 344), and P. A. Taverner writes that a second specimen was taken later. Major A. H. Boies also writes under date of August 6, 1906 from Amherstburg, Ontario, that a man there took a nest of the Mockingbird (presumably during that year). This point is on the Detroit River a little south of Detroit.

In its general habits the Mockingbird is much like the Catbird, and combines in some respects the habits of this bird and the Brown Thrasher. It is well known, however, to far excel both these birds in the power and beauty of its song.

The nest is built in a shrub or low tree and is made of sticks, bark and various fibrous materials, lined with rootlets and fine grasses. The eggs are bluish or greenish, spotted with reddish brown, and average .97 by .73 inches.

TECHNICAL DESCRIPTION.

Adult: Upper parts olive-gray or ash-gray, each feather sometimes with a darker center; wings brownish-black, with two white wing-bars, and bases of primaries white; tail brownish-black, all the feathers except middle pair with large patches of white, the outer pair often entirely white; under parts grayish or brownish white, sometimes almost pure white on throat and belly; bill black. Female similar in color, but usually with rather less white in plumage, and not quite as large. Young similar, but brown above and spotted with dusky below.

Length of adult male 9 to 11 inches; wing 4.10 to 4.90; tail 4.50 to 5.75; culmen .63 to .75.

301. Catbird. Dumetella carolinensis (*Linn.*). (704)

Synonyms: Cat Flycatcher, Slate-colored Mockingbird.—Muscicapa carolinensis, Linn., 1766.—Turdus carolinensis, Licht., 1823.—Mimus carolinensis, Jardine and most of the older writers.—Galeoscoptes carolinensis, Cab., 1850, Baird, 1864, A. O. U. Check-list, 1886, and most subsequent authors.—Orpheus carolinensis, Aud., 1839.

Figure 144.

General color slate, darker above, lighter below, the whole top of the head black, as is also the tail; under tail-coverts deep chestnut.

Distribution.—Eastern United States and British Provinces, west to and including the Rocky Mountains; occasional on the Pacific coast from British Columbia south to central California. Breeds from the Gulf States northward to the Saskatchewan. Winters in the southern states, Cuba, and Central America to Panama.

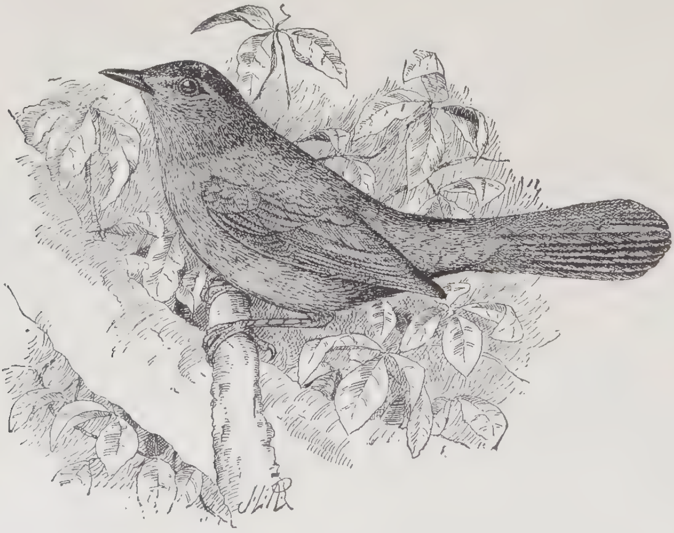

Fig. 144. Catbird. From Yearbook of Department of Agriculture, 1895.
Courtesy of Biological Survey.

The Catbird is too well known to need careful description, being one of our most familiar birds throughout the greater part of the state. It enters our borders from the south usually in April, occasionally as early as the 10th, but more often between the 20th and the 30th, and has been recorded a few times as early as April 4 (Wood, Ann Arbor). It soon spreads over the whole of the Lower Peninsula and extends sparingly into the Upper Peninsula, where the writer found it here and there along the south shore of Lake Superior in the summer of 1903. It has also been recorded from Marquette, Mackinac, Chippewa, Iron, Dickinson, Delta and Ontonagon counties, though not reported abundant in any of these. A single specimen was taken on Isle Royale, September 12, 1905, by the University of Michigan Expedition (Peet, Adams' Rep., Mich.

Geol. Surv., 1908, 380). It lingers rather late in the fall, passing southward in September and October, occasionally lingering in the southern counties until about November first.

It is partial to swampy thickets and brushy woods and coppices in low ground everywhere, but is also a constant frequenter of gardens, parks and orchards, and in fact seems to have a predilection for the vicinity of man.

The nest is a conspicuous structure of twigs, grapevine-bark, rootlets, grasses, leaves and similar materials, lined almost always with black rootlets, and placed usually in thick bushes, shrubs or vines, often close to the house, but also very commonly in the depths of swamps or the edges of deep woods. Frequently in parks and cemeteries the birds select thick evergreens, especially arbor vitæ and Norway spruce, but by far the larger number of nests are placed in lilacs, syringas, honeysuckles, rosebushes, grapevines and other convenient places in the shrubbery about gardens and lawns.

The Catbird is a remarkable singer and is regarded by many as second only to its near relative the Mockingbird. The song possesses great sweetness and variety, but lacks the force of its famous relative. Often the Catbird will sing steadily for half an hour or more from the same perch, or at least from the same bush, with almost no intermission, but at other times it introduces the most incongruous notes, especially the mewing notes which have given it the name of Catbird and those harsher notes which Bicknell describes as a "short, sharp crackling sound, like the snapping of small faggots." It sings early and late, and with added zest during rainy weather. It has also been known to sing at night, though not regularly.

The eggs are three to five, of a deep bluish-green color, without spots, and average .93 by .69 inches. The first nest in middle Michigan is built toward the last of May, and fresh eggs are most commonly found during the first week in June, but a second brood is almost invariably reared, and eggs may be found late in June or during the first half of July.

The food of the Catbird has caused a vast amount of discussion, the opinions expressed being almost as numerous and diverse as those in regard to the Robin. It eats immense numbers of insects, but also consumes large quantities of fruit, but not all the insects eaten are injurious, nor are all the fruits valuable. The bird seems partial to wild fruits, devouring blackberries, raspberries, elderberries, sassafras berries, and those of the spice-bush, as well as various species of cornel, viburnum and other shrubs, together with the berries of the Virginia creeper and grape, as well as occasionally all other cultivated fruits.

Long ago (1879) Professor S. A. Forbes reported on the stomachs of twenty-eight Catbirds which he examined carefully, showing that those collected in May had eaten nothing but insects, those in June but 64 percent of insects, while in July small fruits formed 63 percent of the food and injurious insects only about 15 percent. In summing up his results he said: "If all Catbirds ate like this at all seasons of the year we should certainly class them with curculios and potato beetles as most grievous pests. As far as the ten birds taken in July indicate anything they seem to me to indicate that the Catbird is, to say the best of him, a blessing pretty thoroughly disguised." In 1881 and 1882, twenty-five Catbirds were examined by Forbes, which had been taken in various parts of Illinois. Cankerworms had been eaten by only eight birds and formed but 15 percent of the food of the species. A few cutworms and many other caterpillars brought the lepidoptera up to one-fourth of the food and there was 14 percent of ants, while about one-half the food consisted of beetles. Three Catbirds taken in a canker-worm orchard in Tazewell county, Illinois, and reported on by Forbes had not eaten canker-worms at all. Their preference for ants was clearly shown, these forming 17 percent of their food, predaceous beetles 16 percent, scavenger beetles and thousandlegs each 5 percent, and undetermined caterpillars made more than one-fourth of the food, while a cutworm or two were distinguished. Twenty percent was vine chafers (*Anomala*) and 5 percent consisted of the common spring beetle (*Melanotus*) (Trans. Ill. State Hort. Soc. Vol. 15, 1881, p. 124).

In another report on the food of this bird (Ibid, Vol. 14, pp. 112-113), Prof. Forbes says "The ratios of insects for the five months May to September were 83, 49, 18, 46 and 21. Chinch-bugs were found in the food of one bird only. Orthoptera seemed to be most abundant in the late and early months, diminishing in June and July. Raspberries and blackberries are the most prominent elements of June, July and August. Wild cherries take the place of these fruits in September, and grapes are then eaten to some extent. The credit I have given it must be still further reduced because of its serious depredations on the apple orchards. I have often seen it busily scooping out the fairest side of the ripest, earliest apples, unsurpassed in skill and industry in this employment by the Red-headed Woodpecker or Blue Jay." The Catbird has often been named as a foe to the chinch-bug, but Prof. Forbes says "Among the birds shot in 1880 during midsummer, when the chinch-bug was abundant enough in central Illinois to cause some alarm, the Catbird was found to have eaten these insects in barely sufficient numbers to show that it has no unconquerable prejudice against them" (Ibid, p. 130). Prof. Aughey, of Nebraska, found that the Catbird fed regularly upon the Rocky Mountain locust, birds taken in June of four different years showing from 20 to 40 locusts in each stomach.

The most exhaustive study of the Catbird's food yet made was that carried out by the late Dr. Sylvester Judd, of the U. S. Department of Agriculture, who in 1895 reported upon the food of the Catbird as shown by the examination of 213 stomachs, and various field studies. His conclusions show that beetles and ants form the most important part of the animal food of the Catbird, though smooth caterpillars play no insignificant part. Crickets and grasshoppers come next in importance, and constant but less important parts of the fare are thousandlegs, centipedes, spiders and bugs. It subsists largely upon fruit, of which one-third is taken from cultivated crops. The value of its insect-eating is much lessened by the fact that it eats many predaceous ground-beetles, but on the other hand it eats some of the strong-scented leaf-eating beetles which are decidedly harmful (Yearbook, U. S. Dept. of Agriculture, 1895, 406-411).

Experiments with caged Catbirds gave some interesting results. "After several unsuccessful attempts one Catbird was induced to eat a honey bee. Small slugs, though eaten by one bird, seemed to be regarded as unsavory. Weevils and bad-smelling bugs were eaten with relish, as were also sow-bugs. Plant-lice were refused, though ants which attended them were greedily devoured. Maggots were eaten, and a hideous black spider was torn to pieces by all four Catbirds and then eaten with relish" (Ibid, 410-411). Only one out of 213 Catbirds [stomachs] contained an earthworm.

TECHNICAL DESCRIPTION.

Adult: Most of the plumage clear slate-color or slate gray, darker above, lighter below; top of head and upper surface of tail glossy black; under tail-coverts rich chestnut; bill black; iris dark. Young similar, but head and tail not so black, and under tail-coverts lighter brown.

Length of male 8 to 9.35 inches; wing 3.45 to 3.75; tail 3.70 to 4.25; culmen .65 to .75. Female slightly smaller but otherwise like the male.

302. Brown Thrasher. Toxostoma rufum (*Linn.*). (705)

Synonyms: Thrasher, Brown Thrush, Red Thrush, Sandy Mockingbird, French Mockingbird, Brown Mocker.—Turdus rufus, Linn., 1758, Vieill., 1807, Wilson, 1810, Aud., 1834.—Orpheus rufus, Swains., 1831, Nutt., 1832.—Harporhynchus rufus, Baird, 1858, A. O. U. Check-list, 1886, and most subsequent authors.

Plates LXV and LXVI, and Figure 145.

The large size (nearly a foot long), rust-red back, and heavily brown-spotted breast on a buffy white background are sufficient to discriminate this bird from any other. It may be confused by the beginner with some of the true thrushes, but its larger size, much longer tail, and bright yellow eyes should prevent this.

Distribution.—Eastern United States, west to the Rocky Mountains, north to southern Maine, Ontario and Manitoba. Breeds from the Gulf States, including eastern Texas, northward.

The Brown Thrasher is a summer resident of all parts of the state, but like the Catbird, is most abundant in the southern half, becoming less common over a large part of the Upper Peninsula and even rare in some sections. Its large size, conspicuous color and striking song seldom fail to attract attention and it therefore seems to be more abundant than really is the case. Probably in most sections there are from three to six times as many Catbirds as Thrashers, yet the two birds are almost equally well known.

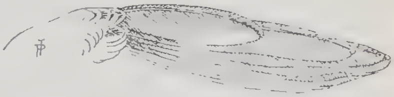
Fig. 145. Wing of Brown Thrasher, showing short first primary. (Original.)

This species arrives from the south somewhat earlier than the Catbird, the average date of arrival at Ann Arbor for twenty-five years being the third week in April, although twice it has been recorded in March, on the 16th in 1894, and on the 18th in 1903 (N. A. Wood). In Ingham county we do not expect to hear its song before the last week in April, and the first nests are not built until about the middle of May. From that time, however, until the first of June fresh eggs may be looked for and second sets are often found late in June or early in July, which makes it probable that as a rule two broods are reared each season.

The nest is a bulky affair built of twigs, weed-stalks and many roots, and almost invariably lined with a profusion of fine roots. It is placed sometimes on the ground, sometimes in a brush heap, and sometimes in a thicket or a low tree, but rarely more than six or eight feet from the ground. It is claimed that the earlier nests, built before the foliage has appeared, are invariably placed upon the ground, while second nests are always in shrubs or trees, but this is by no means true, early nests being frequently found in trees and the June and July nests often on the ground. The eggs are four to six, dull white, heavily sprinkled with reddish brown over the entire surface, and average 1.06 by .78 inches. The parents defend the nest with much spirit and often beat off any less dangerous foe than man.

The song of the Thrasher is difficult of description, but is one of our most remarkable bird performances. Nehrling says "I regard the Thrasher as the finest of our American songsters. It would take the palm even from the Hermit and the Mockingbird if only its period of singing were longer. It is unfortunately a prominent singer for a few weeks only; later in the season its voice is rarely heard. The lay is rich in quality, being full of feeling—at first soft, whispering, delicately plaintive, then loud, powerful and sonorous, wonderful in the variety of its notes and the manner in which the strophes melt into one another. It flows along like a clear, powerful stream, occasionally sinking into soft complaint as of longing, then changing suddenly and becoming louder, fuller, livelier, until the air fairly resounds with the bird's exultant joy. It consists entirely of original notes, those of other birds never entering into the composition. * * * Besides the song one often hears a melodious call-note like 'Yeu' or 'Tshee-uh,' and also a sharp smacking or hissing 'Tshat,' especially when the nest is approached" (Our Native Birds, Vol. I, 1893, 60-61).

The Thrasher prefers a very different territory from that selected by the Catbird, for it is most often found on dry land, in sandy or gravelly regions, especially along the margins of woods, and much less often in swamps or about the borders of ponds and streams. It is a common bird of the barren jack-pine plains and is often found in the thickets and shrubs of the sand-dunes along the lake shores. Nevertheless, it is a common bird on most farms, and is perhaps as often seen while driving along country roads as the really much more common Catbird. In singing it almost always selects a prominent perch, most often the top of a high bush or a low tree.

It begins its southward journey in September, but many individuals linger until the first or even the second week in October, at least in Ingham county.

The food of the Thrasher, like that of the Catbird, has been thoroughly investigated, but certainly does not carry so much economic interest. Careful study of the diet was made by S. A. Forbes of Illinois and by Sylvester Judd of the U. S. Department of Agriculture. The former in 1879 reported as follows on the examination of 28 stomachs, 8 of which were taken in April, 4 in May, 9 in June and 7 in July: "The most remarkable fact brought out is that the bird takes a great deal of matter from the excrement of other animals, not only scavenger and carrion beetles of various kinds, but particles of undigested grain, largely corn. In all 36 percent of its food was obtained from these disgusting sources. In April it ate, in addition to the elements just mentioned, 6 percent of ants, 4 percent of caterpillars, 4 percent of carabidæ, 5 percent of curculios, 8 percent of thousandlegs and 15 percent of cetonian beetles (*Euphoria inda*). In May the food was similar, but with larger percentages of scavenger beetles and carabids. In June 17 percent of ants, 9 percent of grasshoppers, 1 percent boring beetles (Buprestidæ), 1 percent caterpillars, and 18 percent of strawberries and raspberries. In July ants fell to 1 percent, caterpillars increased to 13 percent, carabidæ remained at 5 percent, and there was 3 percent of spring beetles and 5 percent of soldier

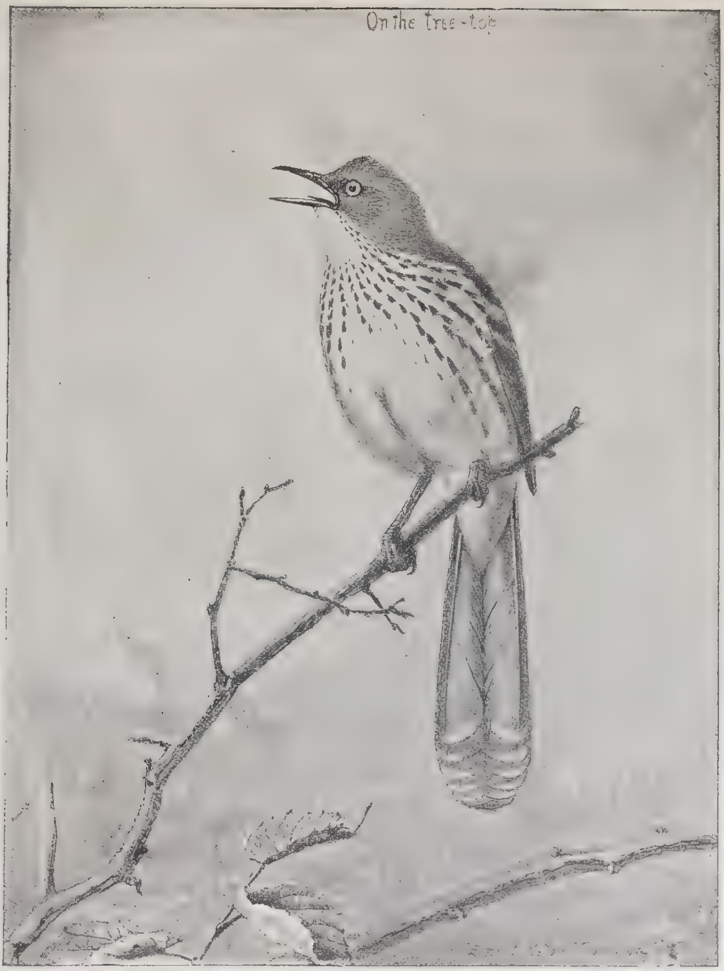

Plate LXV. Brown Thrasher. Reprinted from Chapman's Bird Life.
By courtesy of D. Appleton & Co.

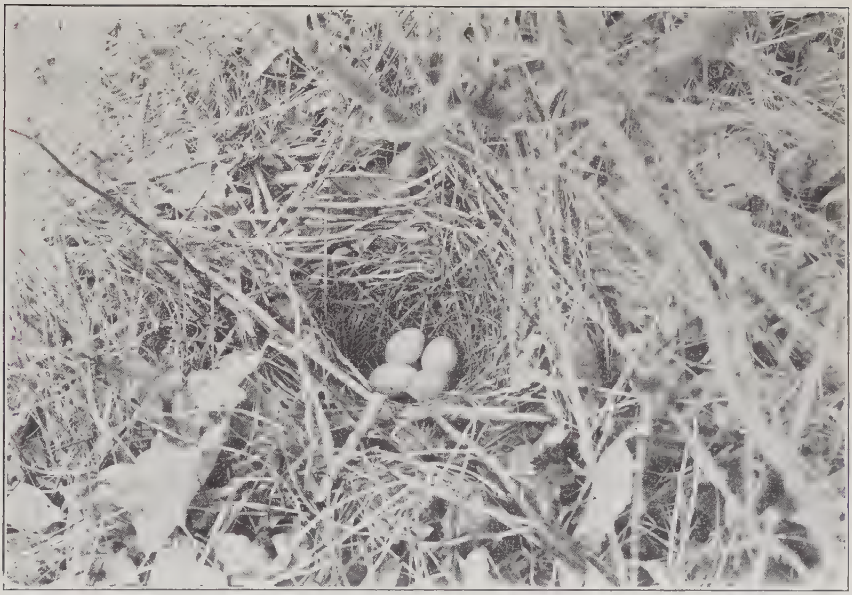

Plate LXVI. Nest and eggs of Brown Thrasher.
From photograph by Thos. L. Hankinson.

bugs. Subject therefore to many reservations I should say that the ordinary services do not entitle it to special protection" (Trans. Ill. State Hort. Soc., Vol. 13, 1879, 135, 136).

In 1880 Prof. Forbes, after further study of the food of the Thrasher, states: "It takes ants more freely than the Robin, but eats comparatively few caterpillars; 7 percent of each were found in the food of the year. Diptera are taken in very trivial quantity, and hemiptera in moderate number only. In the garden it plays a part very similar to that of the other thrushes, but is less mischievous on the whole. It relishes the whole list of garden fruits and later in the season resorts to the wild fruit of the woods and thickets. Compared with the Robin this bird is seen to be especially peculiar in the filth-eating habit already mentioned as distinguishing it from all other thrushes. It takes about half as many lepidoptera, about half as many again coleoptera, nearly twice as many carabidæ and three times as many leaf-chafers, but eats comparatively few grapes and cherries" (Ibid, Vol. 14, 1880, 113-114). Reporting in 1881 on two Brown Thrashers killed in a canker-worm orchard in Tazewell county, Ill., Prof. Forbes says: "Nearly one-fourth of their food consisted of canker-worms and 10 percent of cut worms. Ground beetles (harpalids) brought the average of predaceous beetles up to 24 percent. Twelve percent of spring beetles and 5 percent of snout beetles were the most interesting items remaining." In regard to the chinch bug Prof. Forbes writes as follows: "Among the birds shot in 1880 during midsummer, when the chinch-bug was abundant enough in central Illinois to cause some alarm, three Brown Thrashers were found to have eaten these insects in barely sufficient number to show that they have no unconquerable prejudice against them" (Ibid, Vol. 15, 1881, 130).

Dr. Judd, in his report on the food of the Brown Thrasher, says: "The proportion of the different elements of food of the Brown Thrasher, as determined by an examination of 121 stomachs collected from Maine to Florida and as far west as Kansas, is as follows: Animal matter 63 percent; vegetable 35; mineral 2. Beetles form one-half of the animal food, grasshoppers and crickets one-fifth, caterpillars somewhat less than one-fifth, bugs, spiders and thousandlegs about one-tenth. The percentage of food taken from cultivated crops by the Thrasher amounts to only 11 percent; of this 8 percent is fruit and the rest grain. * * * The Thrasher eats 8 percent of ground beetles supposed to be beneficial, but to offset this he destroys an equal volume of caterpillars, to say nothing of grasshoppers, crickets, weevils, click and leaf beetles. Two-thirds of the bird's food is animal; the vegetable food is mostly fruit, but the quantity taken from cultivated crops is offset by three times that volume of insect pests. In destroying insects the Thrasher is helping to keep in check organisms the undue increase of which disturbs the balance of nature and threatens our welfare. * * * Although the Thrasher takes its maximum of 17 percent of cultivated fruits, mainly red and black raspberries, with a few currants, in July, the horticulturist at this time does not mind the loss, because there is plenty; on the contrary, when cherries and berries first commence to ripen they bring good prices and the loss is keenly felt" (Yearbook, U. S. Dept. Agr., 1895, 412-413).

In Michigan the Brown Thrasher is nowhere too abundant, on the whole is decidedly useful, and should be rigidly protected. Cherries and other fruits can be protected in the same way as recommended for other birds, and the Thrasher can be preserved to destroy the thousands of injurious insects which are attacking the crops and to delight us with his wonderful song.

TECHNICAL DESCRIPTION.

Adult: Entire upper parts, including wings and tail, bright rusty brown; greater and middle wing-coverts tipped with whitish, forming two white bars; under parts white, thickly marked with spots, dashes and streaks of black, except on the chin, throat and middle of belly, which are unspotted; bill mostly black, the base of lower mandible yellow; iris yellow. In autumn all the white is likely to be buffy. Sexes alike.

Length 10.50 to 12 inches; wing 4.10 to 4.60; tail 5 to 5.75; culmen .90 to 1.10.

Family 67. TROGLODYTIDÆ. Wrens.

Our six species may be separated by the following key:

KEY TO SPECIES.

A. Upper parts with white or whitish streaks. B, BB.
  B. Both top of head and back with whitish streaks; culmen not over ⅜ inch. Short-billed Marsh Wren. No. 307.
  BB. Back alone with whitish streaks; culmen over ⅜ inch. Long-billed Marsh Wren. No. 308.
AA. Upper parts without whitish streaks. C, CC.
  C. A conspicuous white stripe over and behind the eye; culmen over ½ inch. D, DD.
    D. Outer tail-feathers conspicuously marked with white toward tips. Bewick's Wren, No. 304.
    DD. Outer tail-feathers without white. Carolina Wren. No. 303.
  CC. Light line behind eye inconspicuous or wanting; culmen under ½ inch. E, EE.
    E. Under parts whitish with few or no bars except on flanks; tail over 1½ inch. House Wren. No. 305.
    EE. Under parts brownish, thickly barred with black; tail 1¼ inch or less. Winter Wren. No. 306.

303. Carolina Wren. Thryothorus ludovicianus ludovicianus (*Lath.*). (718)

Synonyms: Mocking Wren, Great Carolina Wren, Louisiana Wren.—Sylvia ludoviciana, Lath., 1790.—Troglodytes ludovicianus, Bonap., 1824, Nutt., 1832, Aud., 1841.—Certhia ludoviciana, Wils., 1810.—Thryothorus ludovicianus, Bonap., 1838, A. O. U. Check-list, 1886, and most subsequent writers.

Largest of our wrens, about twice as heavy as the House Wren, which it closely resembles in color, proportions and action; the Carolina Wren, however, in addition to its much greater size, has a conspicuous white line over and behind the eye and is decidedly more reddish or rusty on the back and rump than any of our other wrens.

Distribution.—Eastern United States, north to southern New York, southern Michigan and southern Nebraska; west to the Plains. Rare or casual in southern New England and southern Ontario. Resident nearly throughout its range.

This doubtless is the least common of all the wrens found in the state; indeed it is doubtful if it should be considered more than a straggler. Apparently it has been taken about a dozen times within our limits. Mr.

Trombley took a specimen at Petersburg in the spring of 1879, and saw a second one on May 7, 8 and 9, 1889. The following year (1890) he noted three specimens on April 16, a single one on the 18th, and the same or another individual on the 20th, but he reported these as stragglers and does not think that they nested. In May 1892 a pair was seen repeatedly near Petersburg, and as late as June 30, and Mr. Trombley is confident that they nested there. Since this time he has not seen the species, nor has it been reported by any other observer in the county. It was included in Dr. Miles' list of 1860 on the authority of Professor Fox who is said to have taken a specimen at Grosse Isle, Wayne county, many years before. It occurs in Stockwell's list (Forest and Stream, Vol. VIII, No. 17, p. 261), and Covert in his Forest and Stream list reported one as taken at Ann Arbor, Washtenaw county, June 4, 1872. The more recent records are as follows: One taken at Ann Arbor, December 14, 1890, one by P. A. Taverner, near Detroit, August 11, 1906 (Auk, XXIV, 1907, 147), a nest and five young found by A. D. Tinker, near Ann Arbor, June 20, 1909 (Auk, XXVI, 1909, 434), and five individuals, probably belonging to one family, found by Norman A. Wood, on Sand Point, Huron county, August 13-26, 1908. Mr. Samuel Spicer of Goodrich, Genesee county has in his collection a mounted specimen of an adult in perfect plumage, killed at Goodrich, in spring, about 1897, and states that another was heard singing at about the same time and place.

The species is included in several Canadian lists, but is certainly not common even in southern Ontario. McIlwraith records one shot in the town of Mt. Forest in February 1891, and Mr. N. B. Klugh took a young male on Pt. Pelee, Essex county, Ontario, September 5, 1905, and on the following day Mr. P. A. Taverner of Detroit took another and Mr. Klugh secured two fledglings, both males. Besides these an adult bird was seen but not taken (Auk, XXIII, 1906, 105).

In its habits the Carolina Wren much resembles our other wrens, being noisy, musical, nervous, and extremely active. It is seldom quiet for a moment, but flits from place to place, diving into the thickets or piles of brush or dodging about among stumps and fallen trees, all the while uttering its peculiar call-notes and occasionally giving a snatch of song. On occasions it sings beautifully and repeatedly from some conspicuous perch, but is very suspicious and easily disturbed, after which it is not likely to sing again for a long time. According to Chapman: "In addition to his peculiar calls he possesses a variety of loud ringing whistles somewhat similar in tone to those of the Tufted Titmouse and Cardinal, and fully as loud if not louder than the notes of the latter. The more common ones resemble the syllables whee-adel, whee-adel, whee-adel tea-kettle, tea-kettle, tea-kettle."

The nest is built usually in a hollow fence-post, a decayed stump, a woodpecker's hole, or occasionally a bird-box or some cavity about a barn or shed, but the bird is not often familiar enough to nest about buildings. The nest is very bulky and consists of a great variety of materials in which are mingled not only twigs and straws, but moss, feathers, leaves, hair, etc. The eggs are four to six, creamy or pinkish-white, thinly sprinkled with reddish brown dots, and average .75 by .58 inches.

The food of this wren is similar to that of the other members of the family, but consists almost entirely of insects, many of them doubtless harmful.

TECHNICAL DESCRIPTION.

Adult: Above rusty-brown, darkest on head, brightest on rump; below soiled whitish, more or less tinged with rusty on the hinder belly; under tail-coverts whitish, crossed by four or five heavy black bars; a distinct white stripe over and behind the eye, often bordered with an imperfect line of dusky spots; a broad brown streak running backward from eye between the white streak and the whitish throat; wings and tail brown like back, narrowly barred with brownish-black; middle wing-coverts with a few white lines and spots. Sexes alike; little or no seasonal change.

Length 5.25 to 6 inches; wing 2.20 to 2.50; tail 1.80 to 2.35.

304. Bewick's Wren. Thryomanes bewicki bewicki (*Aud.*). (719)

Synonyms: Long-tailed House Wren, Song Wren.—Troglodytes bewickii, Aud., 1827, Nutt., 1832.—Thryothorus bewicki, Bonap., 1838.—Thryothorus bewickii, Baird, 1859, A. O. U. Check-list, 1886, and most subsequent authors.—Thryomanes bewicki, Ridgw., 1877, A. O. U. Committee, 1899.

Only a little smaller than the Carolina Wren, which it resembles closely in general appearance, though decidedly grayer and paler in color. Moreover, the outer tail-feathers are mainly clear black, conspicuously spotted and tipped with white. In habits the bird closely resembles the House Wren and frequently nests in the same localities, in fact, sometimes replacing the House Wren in towns and villages.

Distribution.—Eastern United States, west to the eastern border of the Plains and eastern Texas; rare east of the Alleghanies north of Maryland and Delaware; north irregularly in the Mississippi Valley to southern Minnesota. Migratory only along the northern border of its range.

This is another rare wren which has been taken at only three or four points in the state and apparently is never common. It is possible that, as some observers believe, it is extending its range northward, but there seems to have been little or no change in the last dozen years. The species is included in Stockwell's Forest and Stream list on the authority of a specimen said to have been taken at Niles, Michigan (perhaps by Barron). Dr. Gibbs took a fine male at Kalamazoo May 5, 1877, which was identified by Ridgway, and is now in the Agricultural College collection (catalog No. 5798). Dr. Gibbs states that a few others, perhaps as many as five, had been seen or shot in Kalamazoo during the four years previous. Covert records one as taken at Ann Arbor, June 3, 1878, and Trombley reports one seen April 15 and 16, 1894, and one May 8, 1897, both at Petersburg, Michigan.

The most recent record for the species is that by Leon J. Cole, who found it nesting at Grand Rapids and gives the following facts with regard to its occurrence:

"In the spring of 1894 I had an excellent opportunity to observe a pair of Bewick's Wrens at Grand Rapids. I was not then acquainted with the bird, and no specimen was secured; but my description, written at the time, leaves no doubt of its identity. My first notes were written on May 5 of that year, when a single bird was observed carrying nesting materials to a cigar box which had been nailed to the inside wall of a shed in my yard, with a small hole leading to the exterior. The nest building was carried on in a rather desultory way until the 16th, and never in this interval did I see more than the one bird, which I took to be a male. Much of his time was spent in singing and in flitting about in a small pile of lumber near by. For the nest he appeared to gather grass, bark from neighboring grapevines, and also employed to a small extent some strings and pieces of cotton that I laid out for that purpose. I have no good record of the song, but I take the following from my notes: "His usual song is short, but very pretty; and although it is not much like that of our common wren (House Wren) it resembles it in being slow at first, and more rapid near the close. He has many other songs (variations, it might perhaps better have been said), one of which is like the one described, only more slow throughout."

"On May 16 two birds were seen, and it appeared to me from their actions that the one that had built the nest was attempting to coax the other bird to it. They were much annoyed during the day by a male Bluebird whose mate was sitting on five eggs in a bird house but a short distance away, and were frequently forced to retire into the lumber pile to avoid his attacks. Whether for this reason, or whether for some other less apparent I do not know, but greatly to my disappointment both birds disappeared on that day, and I did not see either of them again.

The nest I saved in its box, and it is now deposited in the Museum of the University of Michigan. I had made no description of the nest, and at my request Mr. Norman A. Wood has kindly sent me the following: 'The nest is in a box 6½ x 4½ inches, 3¼ inches high, and occupies about one-half of the space in the box. The foundation, or base, of the nest, is composed of roots of bushes and weeds, a few sticks, and a string about a foot long. The rest of the nest is made of fine rootlets, and with them is a little wool or cotton [cotton, see above]; this is built up to form a rim, making a cup-shaped interior 2 inches in depth and diameter. The nest is at the end opposite the entrance, which is 1¼ inches square, and a few of the roots extend to this entrance.'

"During the same spring, 1894, I heard birds which I took to be Bewick's Wrens singing at one or two other places in the city, but did not see any of them. Whether my birds returned in 1895 I am unable to say, as I was away that year; but I am certain that they were not in the same neighborhood, at any rate, in the seasons of 1896 and 1897." (Bull. Mich. Orn. Club, Vol. VI, Nos. 1 and 2 Mar.-June, 1905).

The nest of Bewick's Wren is similar to that of the House Wren, but is likely to include more soft material such as bark, strings, feathers, wool, paper, etc., and its location is nearly as variable as that of the House Wren itself. In Illinois and Indiana it often nearly replaces the House Wren and in some cases builds in nesting boxes, holes in trees or cavities about buildings, making the nest large or small according to the cavity occupied. The eggs are five to seven, sometimes eight or even nine, and are white or pinkish-white, finely sprinkled around the larger end with brown and gray. They average .67 by .50 inches.

Ridgway states that its song is "not a voluble gabble like the House Wren's merry roundelay, but a fine, clear, bold song, uttered as the singer sits with head thrown back and long tail pendent—a song which may be heard a quarter of a mile or more and in comparison with which the faint song of the Song Sparrow sinks into insignificance. The ordinary note is a soft low 'plit,' uttered as the bird hops about, its long tail carried erect or even leaning forward and jerked to one side at short intervals."

Its food is similar to that of the House Wren and wherever the bird is abundant it is decidedly beneficial to the gardener and fruit grower.

TECHNICAL DESCRIPTION.

Very similar to the Carolina Wren but decidedly smaller, and colors of back and tail quite different.

Adult: Upper parts deep umber-brown; central tail-feathers barred, others mainly black, the outer ones with white tips and white spots on inner webs; under tail-coverts strongly barred with black and white; a white line over the eye from nostril to nape; under parts grayish-white; flanks brownish. Sexes alike; seasonal changes slight.

Length 5 to 5.50 inches; wing 2 to 2.25; tail 2.10 to 2.40

305. House Wren. Troglodytes aedon aedon *Vieill.* (721)

Synonyms: Brown Wren, Common Wren, Wood Wren, Stump Wren, Short-tailed House Wren, Jenny Wren.—Troglodytes ædon, Vieill., 1807.—Sylvia domestica, Wils., 1808.—Troglodytes americanus, Aud., 1834.—Troglodytes aëdon, Ridgw., 1887, and most subsequent writers

Figure 146.

Known readily by the small size, jerky movements, and tail carried erect over the back, in connection with the brown color of the upper parts, brighter rusty on rump and tail, and the soiled whitish under parts; the wings, tail and sides usually showing fine blackish bars.

Distribution.—Eastern United States and southern Ontario, west to Indiana and Louisiana. Resident from the middle districts southward.

The House Wren is an abundant summer resident over the greater part of Michigan, but is somewhat local in its distribution, being entirely unknown in small areas here and there, but abundant in other districts but a few miles away. We have seen it personally, or had it reported by reliable observers, from all parts of the state, including the entire south shore of Lake Superior. Ordinarily it is found in close association with man, at least during the nesting season, but it is one of the characteristic birds of the waste lands of the north, where the timber has been cut off and fire has swept over the face of the land, leaving numerous dead trees and charred stumps in which the Wren delights to nest. In such places it is often abundant at a distance of many miles from any human habitation and its sprightly and incessant song is one of the cheering features amid the desolate surroundings.

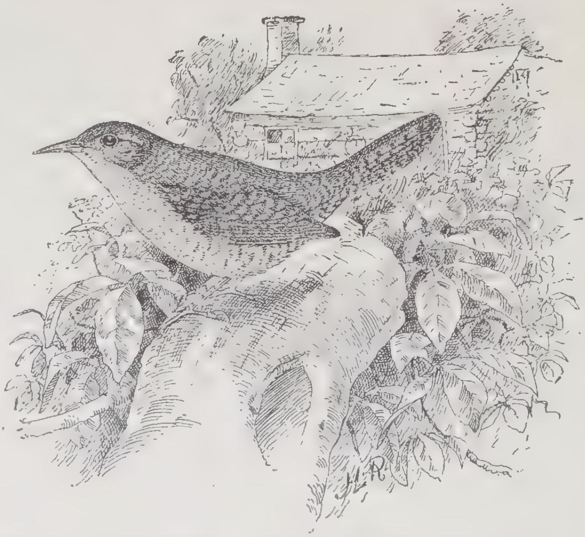

Fig. 146. House Wren. Courtesy of Biological Survey, U. S. Department of Agriculture, Yearbook, 1895.

It arrives in the southern part of the state from the middle of April to the first of May, the earliest date given by Mr. Trombley at Petersburg, Monroe county, being April 15, 1894, and the earliest date given by Mr. Wood at Ann Arbor, March 13, 1887. This, however, is an unusually early date, and Mr. Wood gives the average as the second week in April, which is much earlier than the records for the rest of the state would seem to warrant. In Ingham county the bird rarely appears before the 20th of April, frequently not before the first of May. It is recorded, however, from Bay City as early as April 24, 1894 and April 21, 1896, although the average is about May 4. At Palmer, Marquette county, Mr. Warren reported it May 5, 1894 and May 6, 1895, and it was reported at Sault Ste. Marie May 21, 1900. Dates of departure in the fall are difficult to get, since the bird withdraws from the settled districts after the nesting season and is seldom noticed except by the careful collector, and its disappearance from these wild regions goes unrecorded. Mr. Swales states that it leaves the vicinity of Detroit usually about September 20, but that he saw several as late as October 9, 1889.

Its habits are too well known to need more than a passing mention. It is one of the most familiar birds of our dooryards, coming even into the heart of the larger cities wherever it is assured of protection against the English Sparrow. It occupies boxes prepared for its use, but seems always to have a preference for nooks and crannies about houses and outbuildings, and often puts its nest in most unexpected places. A fish basket, a coffee pot, the sleeve of an unused coat, a half-filled box of clothes pins, a cigar box, are among the places occasionally occupied, and Leon J. Cole states that he has found the nest in tin cans, once in a bathing hat hung up against the wall, and again in the interior of a partially used ball of binder-twine, while another nest was placed in the folds of a horse blanket hung in a corn crib. The usual nesting place is a natural cavity in a tree, either a hollow formed by decay, or the deserted hole of a woodpecker, and in unsettled regions doubtless the great majority of nests are placed in such situations. The material of the nest is as varied as the nesting sites, consisting largely of short twigs, with which the cavity is largely filled, and within this is built the nest proper, consisting of grasses, straws, roots, hairs, etc., often more or less warmly lined with cotton, wool and feathers, although all these soft materials are sometimes absent from completed nests. The first nests are built in May, early or late according to latitude, and a second brood is usually reared in July.

The eggs vary in number from six to ten and are commonly pinkish-white or cream color, thickly and finely speckled with reddish brown, the markings covering the entire egg, and often being so dense at the larger end as to entirely obscure the ground color. Sometimes the eggs seem to be uniform mahogany color. They average .65 by .50 inches.

The House Wren is one of the species which can be greatly increased in numbers by providing it with suitable nesting places. This fact has been shown repeatedly, and we have had a good illustration at the Agricultural College, where in 1896 there were but one or two pairs nesting on the campus. About thirty nesting boxes were prepared and distributed about the grounds, and although the English Sparrow took possession of many of them, the Wrens at once occupied several and each year they have increased in numbers until during the summer of 1906 there were at least twelve pairs nesting upon the campus. It is often recommended that nesting boxes for Wrens be provided with a hole so small that the Sparrows cannot enter, and undoubtedly in some cases Wrens occupy such boxes and avoid much persecution from the Sparrows. We have found, however, by repeated experiments, that when two boxes equally suitable in other respects have circular openings of different sizes, the smaller one just large enough to admit a Wren, this bird almost invariably selects the box with the *larger* opening, and in two instances careful observation showed that the Wrens had great difficulty in taking nesting material into the box with the smaller hole, most of the twigs and grass being dropped on the ground in the effort to get them in. In order to avoid this trouble it is suggested that boxes for wrens be made with the entrance in the form of a slit at least three or four inches in length, but not more than seven-eighths of an inch in width, which will allow the bird to take in any nesting material it pleases, but will still exclude the Sparrow.

But one serious charge has been made against the Wren, if we except the fact that it is notoriously pugnacious and often attempts to drive other birds away from its premises even when they do not seem to be in the least harmful. The fact referred to is that the Wren has been detected several times in the act of destroying the eggs of other birds, puncturing them with its bill, either for the sake of eating the contents, or, as seems more probable, simply out of mischief. A few observers, notably Otto Widmann, of St. Louis, Mo., claim that this habit is quite general, but in Michigan our observations do not confirm this view. Although we have had numbers of Wrens nesting about the College campus for the past ten years, in no single instance have we discovered eggs of other birds which had been punctured in this manner. True, eggs of the Robin, Song Sparrow and Blue Jay have been found upon the ground with large holes in them, but there was nothing in any of these cases to indicate that the Wren was concerned in their injury. In one case a Cowbird was seen eating the eggs of a Chipping Sparrow upon the ground, and it seems likely that the Cowbird, the Blue Jay or the Bronzed Grackle, all of which are superabundant in the vicinity, were the real miscreants.

The food of the Wren consists almost entirely of insects and arachnids, and the species is certainly of great use to the orchardist and gardener in destroying noxious insects. Fifty-two stomachs examined in the Division of Biological Survey, United States Department of Agriculture, and reported on by Dr. Judd, contained 4 percent of ants, 16 percent of caterpillars, 22 percent of beetles, 25 percent of locusts, crickets and grasshoppers, 12 percent of bugs of various kinds, and 14 percent of spiders and thousandlegs. The total amount of animal food was 98 percent, the remaining 2 percent being vegetable rubbish. "Half the food consists of grasshoppers and beetles; the other half is made up of approximately equal quantities of caterpillars, bugs, and spiders. Several of the most important families of beetles were represented, and among them the omnipresent little ground beetle formed 6 percent; weevils, which amounted to 11 percent of the food in June, ranked next in importance. Wrens eat about half as many little dung beetles as weevils. The former amount to 10 percent of the food in May, but are not eaten later in the season. * * * Common grasshoppers, green grasshoppers and crickets form the most important part of the House Wren's food, reaching a maximum of about 60 percent in August, and practically excluding many heretofore conspicuous elements. The Catbird and Thrasher stop eating grasshoppers when fruits ripen, but the Wren keeps right on with the good work."*

Prof. Aughey states that he has "watched parents [Wrens] feed their young in a great number of instances in northern and southern Nebraska and in western Iowa during locust years and always found them bringing a great number of small locusts" (1st Rep. U. S. Entom. Com. Appendix 2, p. 18).

Professor Forbes, reporting on Wrens taken in an orchard overrun with canker-worms in Illinois, says: "Nearly half their food was canker-worms, with about 10 percent additional of other lepidoptera, 13 percent was beetles and 10 percent bugs, the latter including a few chinch-bugs. Two of the birds had eaten Psenocerus supernotatus, making 4 percent" (Bull. No. 6, State Lab. Nat. Hist., pp. 8-9).

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*Yearbook, U. S. Department of Agriculture, 1895, p. 417.

The song is a delightful little warble given with great rapidity and sometimes continued much longer than at others. Usually it is repeated twenty or thirty times with only a few seconds intermission, and during the nesting season the bird sings from morning till night with the utmost energy, apparently fairly bubbling over with exuberance of joy. Bicknell says: "From its arrival late in April until after midsummer the full song is heard, and though sometimes ending in July is often continued through the first week of August. August 15 is my latest date for the song. * * * With the change of the song (usually in July) a change of habits begins and likewise gradually progresses. The birds forsake the vicinity of dwellings and their accessory buildings. To the lay observer they have disappeared, but the experienced eye will detect them inhabiting the rocks and shrubbery of wild and unfrequented localities often remote from human habitation. In such places the autumn song is to be heard, though to one familiar only with the characteristic song of the earlier season its authorship would hardly be suspected. It has none of the spontaneity and vigor of the spring song, but is a low rambling warble" (Auk, I, 1884, 137-138).

TECHNICAL DESCRIPTION.

Adult: Olive-brown above, sometimes more rusty, sometimes more grayish, always more reddish on rump and upper tail-coverts; the wings and tail always distinctly barred with brown and black, and the same pattern often showing more or less distinctly on head and back; below grayish or brownish-white, lighter on throat and belly, darkest on breast and flanks; under tail-coverts brown, heavily barred with dusky. Sexes alike; seasonal changes slight.

Length 4.25 to 5.25 inches; wing 1.90 to 2.15; tail 1.70 to 2.10.

306. Winter Wren. **Nannus hiemalis hiemalis** (*Vieill.*). (722)

Synonyms: Wood Wren, Mouse Wren, Spruce Wren, Short-tailed Wren.—Troglodytes hiemalis, Vieill., 1819, A. O. U. Check-list, 1886, and others.—Anorthura hyemalis, Coues and Prentiss, 1861.—Anorthura troglodytes hyemalis, Coues, 1872.—Olbiorchilus hiemalis hiemalis, Oberh., 1902.

Similar in a general way to the House Wren, but with the tail much shorter in proportion and the feet decidedly larger. The upper parts, wings and tail are brown or rufous like those of the House Wren, but the under parts are much darker than in that species, being brownish-white or light brown from the chin to the middle of the breast, back of which the color deepens and the whole of the breast, belly and sides are barred with black.

Distribution.—Eastern North America, breeding from the northern parts of the United States northward, and in the Alleghanies south to North Carolina, wintering from about its southern breeding limit southward.

This tiny wren is a summer resident of by far the larger part of the state, but its habits are such that it is commonly overlooked in the summer and thus in the southern half of the state is known mainly as a spring and fall migrant. Possibly a few winter in the southern part of the Lower Peninsula, but we have been unable to find an actual record. It reappears early in March and continues to be fairly abundant in the southern part of the state until late in April, at which time it gives snatches of its summer song, but seldom the complete strain. In the fall it returns to southern Michigan in September, but ordinarily not until the middle or last of the month, though occasionally one is seen during the first week. Individuals linger until the last of November regularly, but the greater number move southward beyond our limits during October and November. The lighthouse records show no fatalities for this species during the spring, but on Spectacle Reef Light, Lake Huron, specimens were killed September 21, 23 and 25, 1889, and October 6, 1890.

During migration the bird frequents timber of almost any kind, but seems to prefer wind-falls, brush heaps, and the darker and more tangled recesses of the swamps and woods. It makes its summer home almost invariably among evergreens, and is an abundant nester only among the forests of pine, spruce, balsam and hemlock in the northern half of the Lower Peninsula and in the Upper Peninsula. Nevertheless, wherever groves of these trees are found the bird may be looked for in summer, and there is little doubt that it will be found nesting in favorable localities in all but the southernmost counties of the state. It is rarely seen far from the ground and is most often found creeping about brush heaps, old logs and dense thickets of evergreens, particularly in shady ravines where springs or brooks furnish abundant moisture. In such situations its voice may be heard constantly during the nesting season, and it is not likely to be mistaken for that of any other bird.

Opinions differ widely as to the quality of the song; all agree that it is a very striking performance, but while many call it musical, others think it entirely devoid of any such quality. It consists of a series of perhaps a dozen notes, all uttered in a very high key, but a few of the notes nearly an octave higher than the rest. Different observers speak of it as weird, uncanny, unmusical, squeaky and shrill, but there is much individual variation, and the writer has frequently heard Winter Wrens singing when the notes were entirely devoid of any unpleasant tones, and sometimes even decidedly musical. Ruthven and Gaige made the following notes on this species in Dickinson county in the summer of 1909: "It was heard almost daily during July and the first week in August, but after August 6 it rapidly decreased in abundance and was not recorded after the 12th. It frequented the denser thickets along the river, the depths of the tamarack and spruce swamps, and the lower, thicker, hardwood forest. It was commoner in the two former habitats than anywhere else. Were it not for the loud clear song the species could be very easily overlooked on account of its exceedingly shyness, its small size and the nature of its retreats. As it is the song may be heard at quite a distance and is inexpressibly beautiful when heard in the woods. The birds seem to sing very frequently. No breeding record was obtained for the species." (Manuscript Report.)

When singing the bird most often perches on some dead twig or root close to the ground, and we have never seen it singing from the top of a bush or from a height of more than four or five feet above the surface. Frequently it sings from the hidden depths of a brush heap or the thick tangle of a mass of fallen trees where the performer is entirely invisible. It flits, jumps and glides about in such situations with the utmost celerity and skill, reminding one constantly of a mouse and being almost as difficult to keep in sight. Peet's observations of the bird on Isle Royale in the summer of 1905 are widely at variance with those of most writers. He says: "Very partial to the tamarack and cedar swamps where they would be heard singing from the *tops of the tallest trees.* It was often heard singing along the shores of the lakes and bays, preferring places where there was a rank growth of ground hemlock" (Adams' Rep., Mich. Geol. Surv., 1908, 380).

The nest is placed on or near the ground, but usually in some recess among the roots of trees, in a brush heap, under a log, or even in a burrow in a mossy bank, so that the eggs are rarely if ever visible. It is composed largely of fine dead twigs and green moss, lined with fur, feathers, and sometimes other soft materials. The eggs are white, thinly and finely speckled with reddish brown, mostly about the larger end, but not infrequently these spots are almost wanting and the eggs at first glance appear to be entirely white or creamy white. They average .69 by .50 inches. The usual number in a set is five or six, although seven and even eight have been recorded.

The food presumably is similar to that of the House Wren, but owing to the habitat it has not the economic importance of that species.

Dr. Gibbs found the Winter Wren numerous, and doubtless breeding, in the eastern part of Ottawa county June 10, 1878, and he saw one carrying nesting material near Howard City, Montcalm county, May 13, 1885. L. J. Cole states that about Grand Rapids he has seen the bird during the breeding season, and that E. W. Durfee once found the nest there. At Port Huron Mr. Hazelwood has failed to find the nest and considers the bird rare. The writer found it abundant and still in song in the western part of Mackinac county the first week in August 1901, and since Ruthven Deane found the nest with eggs at Houlton, Maine, on August 8, it seems certain that the species often, if not regularly, rears two broods in a season.

TECHNICAL DESCRIPTION.

Known at once by the very short tail (much shorter than wing) and the disproportionately large feet and legs.

Adult: Upper parts, including wings and tail, dark brown, darkest on head, brightest on rump; usually barred with black everywhere except on head, but the barring most conspicuous on wings and tail, sometimes entirely lacking on the back; outer webs of primaries checked with whitish; wing-coverts with terminal dots of buffy white; chin, throat and breast brownish gray (sometimes only soiled white on the chin), unspotted; belly and sides dark brown, thickly mottled and barred with black; sides of head and neck mottled or streaked with light and dark brown; a buffy white stripe above and behind the eye. Sexes alike; seasonal changes slight.

Length 3.50 to 4.10 inches; wing 1.75 to 2; tail 1.15 to 1.40.

307. Short-billed Marsh Wren. Cistothorus stellaris (*Naum.*). (724)

Synonyms: Fresh-water Marsh Wren, Meadow Wren, Grass Wren.—Troglodytes stellaris, Naumann, 1823.—Thryothorus stellaris, Turnbull, 1869.—Troglodytes brevirostris, Nutt., 1832, Aud., 1834.—Cistothorus stellaris, Baird, 1858, and most subsequent authors.

Mottled black and brown above, with white streaks on back and on top of head; under parts mainly white, but sides and a bar across the chest yellowish-brown.

Distribution.—Eastern United States, north to southern New Hampshire, southern Ontario, southern Michigan, and southern Manitoba, and west to the Plains. Winters in the South Atlantic and Gulf States.

The Short-billed Marsh Wren is generally considered a rare bird throughout the state. As a matter of fact it is very irregularly distributed over the southern half of the Lower Peninsula, probably not occurring north of the Saginaw-Grand Valley, and south of that region being found here and there in moderate numbers, though absent entirely from a large part of the territory.

It seems to prefer the neighborhood of water, yet to avoid ground which is regularly overflowed, and nearly all observers agree that its nest is seldom placed over the water, while the Long-billed Marsh Wren is partial to cattails, reeds and bulrushes, and almost invariably hangs its nest over standing water. The nest of the Short-bill is globular and neatly woven of fine grasses, the growing blades in which it is hung being neatly incorporated so that it is firmly held on all sides. The entrance is through a small hole on the side and this hole is often nearly invisible. It is lined internally with soft vegetable materials, mostly plant down, with sometimes a few hairs and feathers. The eggs are four to six, rarely more, and are usually pure white, without spots. According to Ridgway there are rarely a few lavender spots on some of the eggs, but we have never seen such specimens.

This bird seems to be a rather late comer in spring and probably should not be looked for until the last of May, while nesting probably begins about the first of June. It is known to so few observers, however, and frequents localities so seldom visited, that our migration records are extremely imperfect. N. A. Wood took a single specimen on Charity Lsland, Saginaw Bay, September 16, 1910.

It is far less noisy and demonstrative than its near relative the Large-bill, and it has few or no rattling, scolding notes to attract or give notice to the observer. Its song is very peculiar; a typical wren song, yet less musical perhaps than that of the other members of the family. According to Seton Thompson "Its ordinary note is like two stones being struck together about a dozen times in succession; the first strokes with a slight pause between, those following with a rapidly reduced interval until the last are all run into each other." He writes the song "chap-chap-chap-chap, chap, chap, chap, p-p-p-r-r-r." Our own notation would be rather sit-sit, sit, sit, t-t-t-r-r-r-sit. This song is uttered at short intervals, sometimes for an hour at a time, while the bird perches on the tops of the grass or on a convenient willow bush or fence post not far from its nest.

Like most wrens this species builds numerous false nests, most of them however, not being lined, although occasionally the birds make several nests which appear to be equally complete. In localities where a dozen pairs or more have located, scores of such nests may be found and it is extremely difficult to locate those which contain the eggs. Undoubtedly two broods are often reared in a season. Dr. Gibbs took two eggs June 2, 1882, from a nest in a marsh at Gunn Lake, Barry county, and Mr. Leon J. Cole took a nest and two eggs at Chandler's Marsh, Ingham county, May 31, 1897. The writer found a fresh nest, apparently ready for the eggs, near Walnut Lake, Oakland county, August 2, 1906, and the male bird was singing constantly nearby. Mr. James B. Purdy states that he has known of but two nesting colonies at Plymouth, Wayne county, and Mr. Swales has found it but rarely near Detroit, although other observers report it not uncommon in certain limited areas. Leon J. Cole found nests of this species May 27, 1896 at Fisk Lake, near Grand Rapids, but none of the nests contained eggs and the builders were not seen. Major Boies includes the species in his list of the birds of Neebish

Island, St. Mary's River, but it seems probable that the Long-billed Marsh Wren was the species found there. We have no other record of the bird so far north, except in the Manitoba region, where however, it is abundant.

TECHNICAL DESCRIPTION.

Bill .40 inch or less.

Adult: Upper parts streaked with black, white and buff; wings and tail barred with the same colors; under parts soiled white, unspotted, shaded with pale brown across the breast, the sides, flanks and under tail-coverts a deeper shade of the same. Sexes alike.

Length 3.75 to 3.50 inches; wing 1.70 to 1.90; tail 1.60 to 1.70.

308. Long-billed Marsh Wren. Telmatodytes palustris palustris (*Wils.*). (725)

Synonyms: Marsh Wren, Reed Wren, Cat-tail Wren, Salt-water Marsh Wren.—Certhia palustris, Wilson, 1810.—Troglodytes palustris, Bonap., 1824, Aud., 1831, Nutt., 1832. -Thryothorus palustris, Bonap., 1838.—Cistothorus palustris, Baird, 1859, A. O. U. Check-list, 1886, part.—Telmatodytes palustris, Coues, 1868.

Mainly brown and black above, the back alone with white streaks, the crown black with a median stripe of brown. Under parts white along the middle line from chin to belly, the sides buff or brown.

Distribution.—Eastern United States, north to Massachusetts, Ontario and southern Manitoba, wintering from the Gulf States south to eastern Mexico and locally as far north as southern New England. Breeds throughout its United States and British American range.

The Long-billed Marsh Wren is a common summer inhabitant of all parts of the state where suitable conditions are found. It delights in extensive marshes like those at St. Clair Flats and Saginaw Bay, and about the mouths of large rivers, particularly where reeds, rushes and cattail flags abound. In such locations it is found often in great numbers, and although most abundant in the middle and southern parts of the state, is by no means rare in suitable places along the south shore of Lake Superior. It much prefers large areas of marsh, but is occasionally found in small cattail swamps of an acre or even less, and here and there a pair may be found in the narrow fringe of rushes bordering a small pond; such instances, however, are unusual and not likely to occur except in regions where many similar spots exist in rather close proximity.

This is a hardy bird and lingers with us until late in the fall, at least until the latter part of October, and in the eastern states is known to winter as far north as southern Massachusetts and the lower Connecticut Valley. In Michigan, however, it has not been recorded in winter so far as we can learn, moreover, it is not one of the earliest birds to return in the spring. At Ann Arbor Mr. N. A. Wood gives the earliest arrival for twenty-five years as May 6, 1904, but Mr. Eddy recorded it at Bay City as early as April 29, 1891. Dr. Gibbs noted it at Battle Creek April 26, 1889, and Mr. Swales recorded it at Detroit April 18, 1903. It is by no means unlikely that numerous individuals come north earlier than this, but the inaccessible character of the places they frequent makes it extremely unlikely that their presence will be noted until they begin to sing.

The species is remarkable for the number and character of the nests which it builds. These are globular or ovoid, and built mainly of dead flags, reeds and rushes, woven into a compact mass and the cracks filled with decayed vegetable matter which in some cases gives the impression that mud has been used; we have found, however, no mud in any which we have examined. The interior is rather neatly lined with fine grasses and other soft materials, often with down from the cattails. The entrance is through a small hole in one side which is usually inconspicuous. This nest is swung among the reeds, grass, or cattails, usually over standing water, but occasionally second nests are built in nearly dry situations after the spring floods have subsided. In addition to the nest which contains the eggs the birds build numbers of similar nests which apparently are never occupied, or are occupied only for roosting purposes. It is a common thing to find twenty to fifty such nests in an area of a few acres, and the male is commonly believed to have constructed all these supernumerary nests in order to mislead its enemies and prevent the discovery of the occupied nests. However this may be, not one nest in twenty is found to contain eggs or young, and the birds seem to continue building as long as young remain in any of the nests.

In the southern part of the state eggs are commonly laid about the first week in June and a second set may be found in mid-July or occasionally as late as the last of that month. They are five to eight in number and are so heavily spotted with brown as to give them a dark mahogany or chocolate color, entirely obscuring the ground color. They average .66 by .46 inches.

The habits of this bird are familiar to everyone who has traversed dense cattail swamps through which a boat has to be dragged or poled, the bird and its song being characteristic features of these flooded lands. The bird is continually rambling about among the grass stems, climbing to the tops of the reeds and cattails, and occasionally fluttering a few yards upward into the air, uttering his peculiar sputtering song and then dropping back out of sight in the reeds.

The song is very difficult of description, but is a mixture of scraping, squeaking, bubbling and chattering notes, with a few more musical bars which are certainly wren-like, but also mostly characteristic of this particular species. The bird probably excels all other members of the family in the grotesque attitudes which it takes, frequently, throwing the tail so far over the back, and the head so far toward the tail, that the tips of the bill and tail almost meet.

The food consists very largely of aquatic insects which creep up the marshy vegetation as they transform from their larval condition, and are easily secured by the bird. It also eats small crustacea, as well as spiders, caterpillars, and such other forms of minute animal life as abound in wet places. It cannot be said that the consumption of such forms confers any great benefit upon the agriculturist, but the bird undoubtedly does its part toward restricting the undue increase of insects injurious to water plants.

The only injury which we have ever heard attributed to this bird is the wilful destruction of the eggs of some swamp birds. Mr. Harold Stewart and Mr. T. L. Hankinson have recorded the destruction of the eggs of the Least Bittern, presumably by the Marsh Wren, which was seen hovering around the nests, the eggs in those nests being found punctured immediately afterward (Bull. Mich. Orn. Club, II, 1898, 18). No explanation of this peculiar habit has been made. It seems possible that the wren may pierce the eggs in order to take the contents as food, but this is hardly likely.

TECHNICAL DESCRIPTION.

Bill more than .50 inch in length.

Adult: Crown with a median stripe of rich brown, bordered on each side with brownish black; back brownish black, streaked with white, the rump and upper tail-coverts cinnamon; under parts pure white along the middle line, the sides, from neck to tail, pale brown, unspotted; wings and tail brown, with numerous narrow dark cross-bars; lores and a line over the eye white. Sexes alike.

Length 4.25 to 5.50 inches; wing 1.80 to 2.10; tail 1.60 to 1.90; culmen .54.

Family 68. CERTHIIDÆ. Creepers.

Only one Michigan species, the Brown Creeper.

309. Brown Creeper. Certhia familiaris americana *Bonap.* (726)

Synonyms: Common Creeper, American Creeper, American Brown Creeper, Tree Creeper.—Certhia americana, Bonap., 1838.—Certhia familiaris, Vieill., 1807, Nutt., 1832, Wilson, 1808, Aud., 1839.—Certhia familiaris fusca, A. O. U. Committee, 1899.—Certhia familiaris americana, Brewst., 1879, A. O. U. Check-list, 1886.

Streaked with brown and black above, except on the rump, which is bright reddish brown; below dull white or ashy, unstreaked; wing-feathers marbled with whitish or buffy. The curved, awl-like bill and long, sharp, woodpecker-like tail-feathers, combined with the very long, sharp, curved claws, are distinctive.

Distribution.—Eastern North America, breeding from the northern and more elevated parts of the United States northward, and casually farther south, migrating southward in winter.

This little bird, although known to comparatively few, is nevertheless an abundant migrant throughout the state and a common summer resident in all forested parts, especially where evergreens are found. It is also by no means a rare winter resident in most of the Lower Peninsula, very possibly everywhere in the state. Like most other species, however, the bird is distinctly migratory, and it seems reasonably certain that those individuals which linger through the winter at any point are not the ones which are there in summer, but have come from farther north. Owing to this shifting of the whole species, and the fact that in many places some individuals are present the year around, the exact times of migration are somewhat difficult to determine. The greatest movement, however, seems to take place between April 15 and May 15, and again between September 15 and October 15, when the bird is much more common than at other seasons and appears in groves, parks and orchards, often in considerable numbers. There are no records of specimens killed on Michigan lighthouses except in the fall, the records for Spectacle Reef Light being September 14, 1894, September 26, 1886 and October 5, 1889, 1890 and 1895. From its habit of creeping up the sides of buildings, as well as of trees, it not infrequently enters open windows and is one of the small birds most frequently entrapped in this way.

The habits of the Brown Creeper are very definite and characteristic. It alights suddenly at the bottom of a tree and climbs spirally up the trunk, travelling by little jumps or "hitches," pausing every few inches to probe some crevice in the bark for food and then pursuing its upward course. Often it makes one or more complete circuits of the trunk before it reaches the main limbs and it may then continue its course upward, but more often it takes flight and passes directly to the foot of some neighboring tree to repeat the performance. More rarely still it may be seen creeping along a large branch of some forest tree, or stationary for several seconds at some productive spot on a dead branch. It is so like the brown bark on which it spends most of its life that it is not likely to be seen unless specially looked for.

Its usual call-note is a high-pitched "seet, seet, seet, seet," occasionally uttered singly, but more often repeated two, three, or more times.

During migration the bird moves in little squads of three to a dozen, sometimes associated with warblers, vireos and other birds, but in winter it is almost invariably with a troup of Chickadees, Nuthatches, Kinglets, and Downy Woodpeckers, and these apparently keep together nearly all day. The food gleaned from the crevices of bark consists very largely of insect eggs and the dormant larvæ and pupæ of insects, and so far as we know the bird takes no vegetable food whatever. That it is decidedly beneficial is usually assumed and probably with safety, since the awl-like beak enables it to reach into crevices which are inaccessible to any other bird except possibly to the woodpeckers after some digging.

The Creeper doubtless nests occasionally in every county in the state, but in such small numbers in the southern counties that it has quite generally escaped detection. According to Dr. Gibbs Mr. W. A. Gunn observed a pair of these birds building a nest in Ottawa county May 19, 1879. "It was placed about forty feet from the ground, under the bark of a dead pine at the edge of a pinery. I went to the spot and found the nest quite inaccessible." Leon J. Cole states that a nest was found near Grand Rapids by Mr. Owen Durfee, but was broken up. Several other observers record the presence of the bird in summer in the lower counties of the state, but we know of no other nest being found. North of the Saginaw-Grand Valley the bird is resident through the summer in considerable numbers, and is reported as nesting commonly in all suitable places. Miss Flora L. Mowbray states that it is common and nests at Marquette, and it is also reported as breeding at Ludington, Mason county, by Miss Ida McClatchie. The writer found it fairly common on Beaver Island, Lake Michigan, in July 1904, and he also found it in Mackinac, Alger and Chippewa counties in 1903.

The nest seems to be placed invariably beneath a partly loosened sheet of bark which is still attached firmly to the tree, and which shelters it from the weather as well as from observation. In the narrow space between the bark and the tree the bird constructs a substantial but somewhat irregular nest of twigs and shreds of bark of various kinds, and lays four to six eggs, which are white or creamy white, speckled chiefly at the larger end with reddish brown. They average .60 by .48 inches.

Few have heard the Creeper's song, the call-notes already described being the only ones usually heard. Mr. Brewster, however, states that during the nesting season it is a frequent singer and its voice "though one of the sweetest that ever rises in the thickets of northern forests, is never a very conspicuous song. This is due to the fact that the song is short and by no means powerful, but its tones are so exquisitely pure and tender that I have never heard it without a desire to linger in the vicinity until it has been many times repeated. It consists of a bar of four notes, the first of moderate pitch, the second lower and less emphatic, the third rising again, and the last abruptly falling, but dying away in an indescribably plaintive cadence like the soft sigh of the wind among the pine boughs. I can compare it to no other bird voice that I have ever heard" (Bull. N. O. C., IV, 1879, 206).

TECHNICAL DESCRIPTION.

Bill very slender, awl-shaped, strongly curved downward, and almost needle pointed; the tail-feathers long, slender and stiff, resembling those of a woodpecker, and used as a support in the same way.

Adult: Upper parts, from bill to lower back, dark brown, streaked with white, each white streak more or less margined with black; lower back and rump bright rusty-red, obscurely streaked with brown; tail-feathers brown, unmarked; wings brown, crossed by two broad bars of buffy white; under parts from bill to tail pure white, or lightly margined with rusty on the under tail-coverts; sides of the head and neck mottled brown, black, and white, like the top of the head. The female is like the male in color but slightly smaller; there are no marked seasonal changes.

Length 5 to 5.75 inches; wing 2.40 to 2.70; tail 2.30 to 2.90; bill .60 to .80.

Family 69. SITTIDÆ. Nuthatches.

Two species occur regularly in the state, and a third, the Brown-headed Nuthatch, accidentally if at all.

KEY TO SPECIES.

A. Underparts mainly white or whitish. B, BB.
  B. Large, wing 3½ inches or over. White-breasted Nuthatch. No. 310.
  BB. Small, wing less than 3 inches. Brown-headed Nuthatch. (Appendix.)
AA. Under parts mainly rust red or buffy brown; wing less than 3 inches. Red-breasted Nuthatch. No. 311.

310. White-breasted Nuthatch. Sitta carolinensis carolinensis *Lath.* (727)

Synonyms: White-bellied Nuthatch, Carolina Nuthatch, Common Nuthatch, Sapsucker.—Sitta carolinensis, Lath., 1790, and most other writers.—Sitta melanocephala, Vieill., 1819.

Plate LXVII and Figure 147.

The bluish-gray upper parts with darker crown, pure white under parts and sides of head, and soft, dark tail, broadly marked with white, are characteristic. Add to this the straight, strong, slender bill and powerful feet, and the bird cannot be mistaken. In life its action is equally characteristic; only a nuthatch scrambles continually up and down tree trunks, sidles rapidly along the main branches or runs nimbly under and over them, as often head downward as otherwise. Its smaller relative, the Red-breasted Nuthatch, has a color pattern so different as to make any confusion unlikely.

Distribution.—Eastern United States from Georgia north to the southern British Provinces and west to the Rocky Mountains.

It is somewhat remarkable that a bird so abundant as the White-bellied Nuthatch should be so imperfectly known to the average resident of town or country. In the Lower Peninsula there probably is not a town or village in which this bird is not frequently to be seen if looked for, and in most localities it is a regular inhabitant of parks and shade trees, not only in the suburbs, but even in the cities themselves. Where this is not the case it is usually because the English Sparrow has occupied all the possible nesting places, and so the Nuthatch is found only during migration, or in winter.

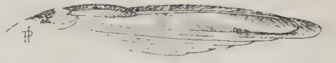
Fig. 147. Wing of White-breasted Nuthatch, showing very short first primary. (Original.)

Its habits are too well known to need extended description. It is one of the most restless and energetic birds known, seldom quiet for a dozen seconds at a time, but usually running up and down the trunks and larger branches of trees, often with a beech-nut or acorn in its bill, and occasionally seen hammering (that is, "hatching") that bit of food with its sharp bill, having previously wedged the nut into some crevice of the bark. At other times it may be seen carrying bits of acorn meat or the kernels of seeds which it has shelled, and if watched it will be seen to crowd these into crevices of the bark or hide them in natural or artifical holes in the trunks of trees or the cracks of fence posts, whence undoubtedly it sometimes extracts them again in time of need.

Although abundant throughout the year in most places, there is nevertheless a migration of the species as a whole, a swinging of all the individuals southward in winter and northward in summer, so that we are not sure that the individuals which nest with us are the same which we see in midwinter. Even in summer this species does not seem to be very abundant in the Upper Peninsula, at all events, not equally abundant in all parts. Most of our reports from north of 45° speak of the bird as rare, or at least not very common, but here and there observers find it abundant and nesting. In the southern part of the state it is fully as abundant in winter as in summer, but for a time in March and again in October it seems to be more abundant than at any other period.

This bird is known sometimes to nest very early in the season; the writer saw one carrying nesting material into a hole in a brick wall at the Agricultural College on March 9, 1896, and another was seen taking food into a hole in a tree in the neighboring woods on April 11, 1896, which would seem to show that it was then feeding young. At the present writing (April 12, 1912) we have a pair under observation on the College campus which are feeding young in a knot-hole in an oak. On the other hand, we have records of nearly a dozen sets of eggs, all, with one exception, taken in May, the exception being a set of nine taken in Kalamazoo county April 27, 1889 by the late Richard B. Westnedge. Other nests taken by the same collector are as follows: Four eggs May 25, 1887, four eggs May 5, 1888, eight eggs May 2, 1890, and three sets of eight, eight and seven respectively on May 2, 1890. Mr. Samuel Spicer of Goodrich, Genesee county, took a set of four eggs May 6, 1888, and Leon J. Cole took a nest of eight eggs at Grand Rapids May 4, 1897. These facts suggest the possibility of two broods, one hatched in April and the other late in May, although this is contrary to the statements of most authors, from Audubon down.

A nest taken by Mr. Trombley, at Petersburg, is described as follows: "The nest was in a dry basswood stub about twenty-five feet from the ground. The hole was only about six inches deep, but was quite large, at least eight or ten inches in diameter, not a knot-hole but apparently

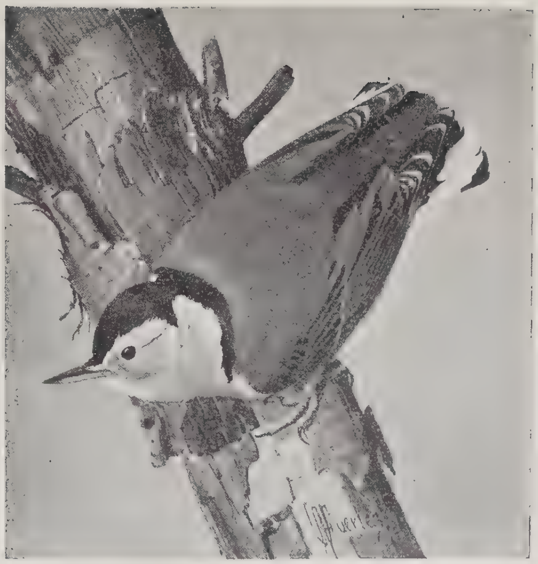

Plate LXVII. White-breasted Nuthatch.

From Coues' Key to North American Birds. 5th edition. Dana, Estes & Co.

a crevice or rotten place which had been cleaned out by the birds, making a capital nesting place. The nest was composed of fine strips of inner bark of basswood, forming the base, and on top of the bark a large mass of rabbits' fur to the thickness of nearly an inch. The nest measured about eight inches in diameter and was saucer-shaped, the greatest depth of the cavity not being over an inch." Other nests are similar, and almost without exception they are placed in the natural cavities of trees, rarely if ever in a deserted woodpecker's hole, and probably never in holes entirely excavated by the birds themselves. Most often the cavities are in living trees and in many cases the entrance is through an old knot-hole just large enough to give the bird admission.

The eggs vary in number from five to eight, or occasionally to nine or possibly ten. They are white or creamy white, speckled with reddish brown, and average .72 by .55 inches.

The food of this bird is said to consist chiefly of insects together with their eggs or larvæ, these being dragged from crevices in the bark, and it has also been noticed that the birds feed upon beech-nuts, pine seeds, acorns and similar food. A careful study of the food of this species was made under the author's direction, in 1898, by Mr. E. Dwight Sanderson, who studied the food habits both of Nuthatches and Chickadees and presented the results as a thesis for graduation at the Michigan Agricultural College. He examined the stomachs of twenty-three White-breasted Nuthatches taken in winter and eleven in early spring, all from Ingham county, Michigan, and his conclusions as to the food are as follows: "During the winter the larger proportion of the food was composed of seeds, which gradually decreased as insect life became more abundant. Some of the seeds eaten were Indian corn, bitter-weed and sunflower. Most of the seeds were so badly broken as to be undeterminable. The insect food formed about 26 percent of the whole during the winter, but almost 80 percent of the food in spring, the remainder being vegetable matter except for 6 or 7 per cent of sand or gravel. * * * The insect food is taken more or less indiscriminately and the beneficial forms eaten fully equal those which are more or less injurious, while none of the Nuthatches were found feeding upon any insect pest. In view of these facts I should desire to experiment somewhat with them in an infested orchard before declaring them to be merely neutral, yet from all the data secured there would seem to be little doubt that the Nuthatch, both from its food and habits, is either absolutely neutral or of comparatively small economic importance" (Auk, XV, 1898, 145-150).

Nuthatches are by no means musical, and nothing which can properly be called a song is ever heard from this species. The usual note is a loud, nasal "hank," commonly repeated three or four times in quick succession. In early spring, however, it has a clear rolling call somewhat resembling the "look-look-look" of the Flicker.

TECHNICAL DESCRIPTION.

Adult male: Entire upper surface of head, from bill to nape, glossy black, this color extending backward over the forepart of the back; most of the remaining upper parts clear bluish-gray; the inner wing-feathers and greater coverts boldly marked with black; the two middle tail-feathers gray like the back, the others black with large white blotches, so that the tail appears to be nearly half white; under parts uniformly white or grayish white, with more or less bright chestnut on the hinder belly and under tail-coverts. sides of head and neck white, this color extending more or less above the eye. The female is very similar except that the glossy black of the head is replaced by dark gray. There are no marked seasonal changes.

Length 5.25 to 6.15 inches; wing 3.50 to 3.75; tail 2 to 2.25.

311. Red-breasted Nuthatch. Sitta canadensis *Linn.* (728)

Synonyms: Red-bellied Nuthatch, Canada Nuthatch, Sapsucker.—Sitta varia, Wils., 1808.—Sitta stulta, Vieill., 1819.—Sitta canadensis of most other authors.

Plate LXVIII.

A smaller edition of its white-breasted relative, but usually known by the light rusty-brown breast and belly and the sharp black stripe (slate color in the female) across the side of the head, with a white stripe above it.

Distribution.—North America at large, breeding from northern New England, northern New York, and northern Michigan northward, and southward in the Alleghanies, Rocky Mountains and Sierra Nevadas; in winter, south to about the southern border of the United States.

Nearly all observers agree that this species is decidedly less common in Michigan than the White-bellied Nuthatch, the exceptions being those located in the higher parts of the Lower Peninsula and in a part of the Upper Peninsula. Like the preceding species, the Red-belly is found throughout the year in all parts of the state, but in greatly reduced numbers during the winter. A marked migration takes place, the birds passing southward, sometimes in large numbers, during the latter part of August and the first half of September, and a similar but less marked northward migration occurs late in April or early in May.

Everywhere in the northern part of the state the bird is a common summer resident in suitable localities, namely in evergreen (particularly hemlock) forests or tamarack swamps, while in the southern half of the Lower Peninsula the bird is entirely absent in summer, or at most occurs only in scattered pairs in the most favored localities.

According to Jason E. Nichols of Lansing the bird formerly nested in this vicinity, but, although it is common now during autumn, winter and spring, it has not been noted here in summer during the past seventeen years. Mr. B. H. Swales states that it appears at Detroit usually in early September, sometimes during the latter part of August remaining until November, and becomes abundant again in early March, remaining until about the 10th of May. He also says that it is occasionally seen in winter. Dr. Gibbs states that it is a species which "wanders about after its nesting duties are over, and may be found from September to December, and again from March 15 to May 1, in any part of the state, but in no case with certainty."

The fact that its numbers vary greatly in different years has been noted by numerous observers, and the species appears to be one of the most variable in numbers of any bird which we have. Occasionally it is really numerous for a short time in the fall, while in other years scarcely an individual will be seen, and an entire winter may pass without a single one being noted. On the other hand, a few linger all winter even at the far north. Mr. F. H. Chapin reports it a common winter resident in Mackinac, Alger and Luce counties, and Mr. Wilbur H. Grant recorded it at Houghton, Mich., in November 1904, and again the last week of January, and on February 26, 1905, at the same place. Dr. Gibbs found it only a migrant in Kalamazoo and Ottawa counties, but a summer resident in Montcalm and Wexford counties. The records from the lighthouses include no spring specimens, but Red-bellied Nuthatches were killed on Spectacle

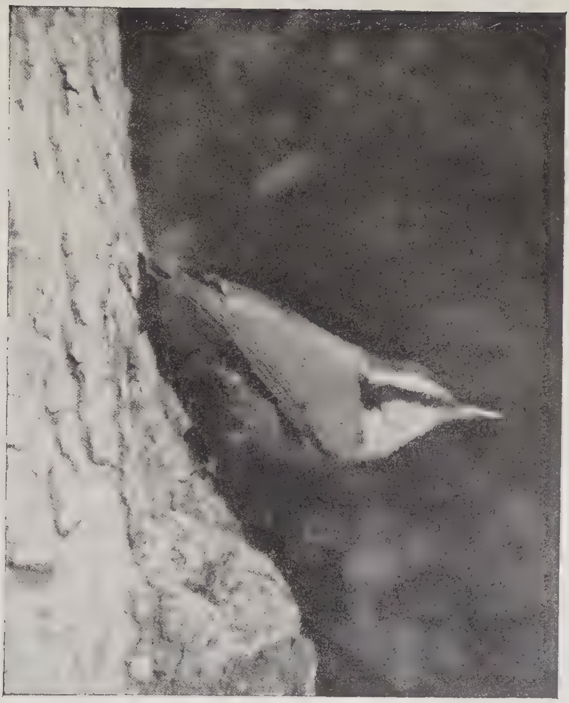

Plate LXVIII. Red-breasted Nuthatch.
Photographed from life by Lawrence J. Webster.
Courtesy of Bird Lore.

Reef Light, Lake Huron, August 19, 1889, August 28, 1895, September 16, 1888 and September 29, 1889.

During the southward migration, in September and October, this little bird is often abundant among red cedars and the various pines and spruces, from which it gathers the seeds in large numbers and stores them beneath scales of bark, in crevices in tree trunks, and, as the writer has repeatedly noticed, in the punctures made by the Sapsucker in various species of trees. In several cases we have known one of these Nuthatches to spend apparently his entire time for several days in succession in collecting seeds from the cones of a pine tree and storing them in various hiding places in the vicinity. During the winter one or more can usually be found on the College campus visiting the bones and other food supplies put out for the purpose of attracting birds.

Apparently much remains to be learned of the nesting habits of the Red-breasted Nuthatch. It is reported as breeding commonly in all the northern sections of the state wherever pine or other evergreens are abundant, but very few observers have actually seen, or at least recorded, the nest. It does not seem to restrict itself so closely as does the White-breast to the natural cavities of trees, but often, perhaps most often, makes use of a deserted woodpecker's hole, in which it builds a nest of soft materials, much like that of the White-bellied Nuthatch, laying from four to six or more eggs which are creamy white, speckled sparsely with reddish brown, and average .59 by .46 inches.

Dr. W. H. Dunham reports finding a nest in Kalkaska county on May 17, 1899, placed in a hole in a maple stub, about thirty feet up and containing four fresh eggs. He says that the opening to the nest was smeared with pitch, especially on the lower side, and this appears to be a very general habit of the species, and so far as we know is unique, no other bird using pitch about its nest. No explanation of the presence of the pitch is offered and the use, if it has one, is quite problematical. Since the bird gets a very large part of its food from resinous trees, and especially from cones, its feet and beak might often be smeared with pitch, yet this certainly would not account for its presence in such large quantities about the nesting hole. Mr. Chas. E. Engles records the finding of a nest of this species at Templeton, Mass., June 10, 1894, which contained three fresh eggs of the Nuthatch and two young birds, which in all probability were White-bellied Swallows. No good explanation for this mingling of families is given, but it is at least possible that the Nuthatch had ousted the Swallow, added some eggs of her own and incidentally hatched some of the Swallow's eggs. The date is unusually late, for this species is supposed to nest quite early in the spring. Nests found June 2, on an island in Penobscot Bay, Me., and another June 20, at Holden, Me., contained eggs, and the openings to both nests were liberally coated with pitch. One of these was in a white birch stub, and the other in a poplar stub some twelve feet from the ground. The hole in the latter case had "fir balsam one-fourth of an inch thick for two inches below the hole, and then thinner, and running down in long drops for twenty-one inches below the hole. The pitch extended one inch on either side and more than three inches above the hole, in all more than could be heaped upon a large tablespoon."

The food of this bird is presumably much like that of the White-bellied Nuthatch, yet it seems to be much more fond of the seeds of cones, and possibly does not consume as many insects. It is said to visit the ground much less frequently, but so far as our own observation goes there is little difference; either species goes to the ground freely and hunts for food, sometimes for several minutes at a time. The idea advanced by Sanderson that the White-bellied Nuthatch opens acorns, and perhaps other seeds, mainly or entirely for the worms contained, is certainly not tenable in regard to the present species and does not commend itself for either species so far as our observation goes.

The note of the Red-bellied Nuthatch is often written "hank, hank, hank," as for the White-bellied species, but in reality the notes are widely different in pitch and in resonance; those of the Red-bellied Nuthatch have been aptly likened to "a tiny tin trumpet," and the syllables "teng, teng, teng" perhaps give some slight idea of the sound.

While the feeding habits of the two birds are quite similar, and both get a large amount of food from the boles and branches of large trees, the present species is much oftener seen on the slender branches and among the tufts of dead leaves which cling to the twigs through the winter, where it undoubtedly collects many a choice morsel in the shape of hibernating insects, pupæ and eggs.

TECHNICAL DESCRIPTION.

Adult male: Head above, from bill to nape, black; remainder of the upper parts clear bluish gray, the wing-feathers more brownish; a white stripe from bill to nape over the eye and a black stripe through the eye from bill to side of neck; chin white, shading into pale reddish-brown, which becomes deeper on the breast, belly and particularly on the sides, which it covers completely; middle tail-feathers bluish gray like the back, others black, with white blotches, much as in the White-bellied Nuthatch. The female is similar, except that the black of the crown and nape is replaced by dark gray. The seasonal changes are slight.

Length 4.10 to 4.75 inches; wing 2.60 to 2.85; tail 1.50.

Family 70. PARIDÆ. Titmice, Chickadees.

The four Michigan species may be separated as follows:

KEY TO SPECIES.

A. With a conspicuous crest (Fig. 148). Tufted Titmouse. No. 312.
AA. Not crested. B, BB.
  B. Top of head glossy black. C, CC.
    C. Outer web of wing and tail feathers white edged. Black-capped Chickadee. No. 313.
    CC. Outer web of wing and tail feathers not white edged. Carolina Chickadee. No. 314.
  BB. Top of head clear brown. Hudsonian Chickadee. No. 315.

312. Tufted Titmouse. **Bæolophus bicolor** (*Linn.*). (731)

Synonyms: Tufted Tit, Tufted Chickadee, Crested Titmouse, Peto Bird. Parus bicolor, Linn., 1766, Wils., 1808, Aud., 1831.—Lophophanes bicolor, Bonap., 1850, and many others.

Figure 148.

The conspicuous crest (like the Blue Jay's), the gray upper parts, soiled white underparts and rusty sides, combine to mark this species beyond question.

Distribution.—Eastern United States to the Plains, north to southern New Jersey and southern Iowa; casual in southern New England. Resident throughout its breeding range.

This interesting bird is confined to the southern part of the Lower Peninsula and appears to be nowhere common even there. By far the greater number of reports are of winter specimens, and some observers contend that the bird is a migrant and occurs only in spring and fall, while the great majority of observers have failed to find the species at all. Considering all the facts that we have been able to gather there would seem to be no reason to suppose that the bird migrates, but rather that it occurs here and there, singly or in pairs, and is resident wherever found, but that it is very irregularly distributed and by no means always to be found in the same place.

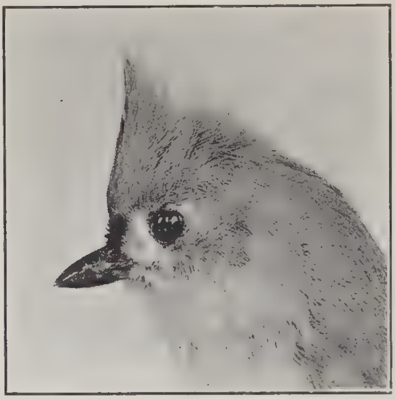

Fig. 148. Tufted Titmouse. From photograph of mounted specimen. (Original.)

Mr. Trombley of Petersburg has found it in different seasons from February 25 through the whole of March and April and a large part of May. He also states that he found it nesting at Petersburg in one instance. About Detroit Mr. Swales has found it only in certain sections, as on Belle Isle in the Detroit River. He says: "I firmly believe that the species breeds in limited numbers on the Island, although I personally have not observed the bird there later than the middle of May. June 24, 1905 Mr. Taverner heard one whistling in a woods just north of Detroit, and on August 6 we heard the bird in the same place and it was secured; another was seen August 27. This pair without doubt bred in this locality." Dr. Atkins recorded it but twice at Locke, a pair April 30, 1871, and a single specimen April 12, 1881. Jason E. Nichols of Lansing, has a specimen in his collection taken in that vicinity, and the species has been observed repeatedly about the Agricultural College, but not in any numbers. It is most often seen during winter when occasionally one or two may be found with a troup of Chickadees, Nuthatches and Kinglets as they come close about the houses searching for food. The writer has also taken it once in August, and T. L. Hankinson recorded one on the College campus September 20, 1896. During the past winter (1912), it was reported from Eaton Rapids, Eaton county. It is recorded from Van Buren county by Dr. Gibbs who states that a specimen was collected there by Mr. B. F. Syke.

A specimen was taken at Ann Arbor September 15, 1877, and three specimens October 5, 1886 (Covert). "During the fall and winter of 1903, the species appeared to be fairly common, as J. J. Ricks noted a flock at Portage Lake, and it has been noted several times in the vicinity of Ann Arbor, on Dec. 13, 1900, Feb. 7 and 21, and March 13, 1904" (Wood and Tinker, Auk, XXVII, 1910, 141). According to G. A. Stockwell (Forest and Stream, Vol. 8, page 261) it was plentiful in 1870 in Eaton and Barry counties.

The late Percy Selous observed a male at Greenville, Montcalm county, February 23, 1900, but this was the only one recorded for that locality. Mrs. Robert Campbell, of Jackson, noted two May 19, 1906. The species is reported by one observer in Marquette county, 1901 to 1904, but it seems probable that this record is based on a wrong identification; we have no other record for the Upper Peninsula, and it is not known to occur in Wisconsin except in the southern part of the state, and that very rarely.

In its habits it is much like the common Chickadee, but shows many peculiarities of its own. According to Nehrling, in Missouri, "They scramble about among the limbs with great agility and restlessness and may be often seen hanging head downward on horizontal branches and trunks of trees, whilst exploring with great thoroughness every crevice of the bark for insects, their eggs and larvæ. They also show a liking for oily seeds, particularly those of hemp and the different species of small wild sunflowers. At times they will not despise berries, though they eat their seeds only. They also make occasional visits to meat which has been hung out in the air to dry. * * * All its notes are very loud and clear, and uttered with whistling reverberation. During the sunny winter days it shouts with all its might: 'hee-dle-dee-dle-dee-dle-dee-dle,' and this is particularly the case as the mating season approaches. * * * Among other notes is a loud and querulous 'pe-to-pe-to-pe-to-pe-to-day-tee-day-tee,' which is especially pleasing. * * * They are extraordinarily inquisitive, even daring to come close to the observer."

The nest is always placed in a cavity of some kind, usually the natural hollow of a tree or fence post, or a deserted woodpecker's hole. Occasionally it nests in boxes provided for the purpose or for wrens and swallows. The nest is built largely of wool, fur, hair, feathers and various soft cottony substances and the eggs vary in number from five to eight, and average .71 by .55 inches. They are similar to those of the other members of the genus, being white, sparingly speckled with reddish-brown. In the southern states the bird rears two broods, but in Michigan it may rear but one.

Mr. A. D. Tinker found a nest in an ash, elm and maple swamp near Ann Arbor, May 24, 1908. It was located "in the dead, broken limb of a stately elm some fifty or sixty feet from the ground. An old, abandoned woodpecker's cavity had been appropriated and filled, as far as could be ascertained by means of a glass, with dead grasses, etc." It was found by watching a female which was collecting food (various insects) and taking it to the young. The nest itself was inaccessible (Auk, XXV, 1908, 323).

TECHNICAL DESCRIPTION.

Adult: Forehead black, entire remainder of upper parts, including wings and tail, clear ash; a small white patch between the base of the upper mandible and the eye (lores); throat, breast and belly grayish-white, often with a yellowish or brownish tinge; sides chestnut; a noticeable crest much as in the Blue Jay; bill and feet black.

Length 5.60 to 6.50 inches; wing 3 to 3.50; tail 2.80 to 3.15. Sexes alike and seasonal changes slight.

313. Black-capped Chickadee. Penthestes atricapillus atricapillus (*Linn.*). (735)

Synonyms: Common Chickadee, Eastern Chickadee, Black-capped Titmouse.—Parus atricapillus, Linn., 1766, and of most authors.—Pœcile atricapillus, Coues, 1868.—Parus palustris, Nutt., 1832.

Top of head from bill to nape lustrous black, as are also the chin and throat; sides of head and neck clear white; breast and belly whitish, the sides and flanks buffy; back, wings and tail gray.

Distribution.—Eastern North America north of the Potomac and Ohio Valleys.

Perhaps this is the best known arboreal bird of the entire state. Common summer and winter alike, and particularly noticeable while the trees are leafless and other birds are scarce, the fluffy little Chickadee comes freely about dwellings even in towns and cities and is almost universally recognized and protected. While it wanders more or less after the nesting season and very possibly migrates southward to some extent every winter, yet it is one of those species commonly called resident through the year and in any locality may always be found if looked for.

It is one of the species which does absolutely no harm so far as we know, never attacking fruit or grain nor injuring any vegetable growth whatever. It is possible, and even probable, that among the millions of insects and insect eggs which it eats it does not always discriminate between useful and harmful forms, but in the main its work as an insect eater is decidedly beneficial, and, all things considered, the agriculturist has no better friend among the birds.

Its habits are too well known to need extended notice. Every one is familiar with its actions; hopping from twig to twig, clinging to the bark of the trunk and large limbs of a tree, hanging head downward beneath a branch or swinging on the end of a pine cone, always prying into the cracks and crevices of bark, bud and leaf and extracting the tiny insects or the tinier eggs which are a constant threat to the welfare of orchard, park and grove.

Numerous critical studies of its food have been made, some of them involving the destruction of many Chickadee lives in order that the stomach contents might be carefully determined. The results of these studies are surprisingly uniform. Even during winter at least half the Chickadee's food consists of insects and their eggs, and we have no bird which eats so many insect eggs summer or winter as this bird. In studies made at the New Hampshire Agricultural Experiment Station during winter it was found that the eggs of plant-lice made up more than one-fifth of the food, and apparently the only possible harm done was the consumption of a comparatively small number of spiders and their eggs, these forming perhaps 5 percent of the entire stomach contents. It was shown that often more than 450 eggs of plant-lice were eaten by a single Chickadee in the course of a day. Among other eggs found were those of the tent-caterpillar and the fall canker-worm, while larvæ of the codling moth and bark beetles of the family scolytidæ were eaten freely.

Under the author's direction, Mr. E. D. Sanderson examined the stomachs of twenty-eight Michigan Chickadees, nineteen in winter and nine in spring, and has recorded among the results some very interesting facts (Auk, XV, 145-155). He found that less than 40 percent of the food was vegetable, the remainder consisting of insects, while the stomachs of nine birds taken in spring contained nothing but insects. Among the seeds seaten were a few bits of oats, a single seed of the bitter-weed (*Ambrosia*) and a few other bits of vegetable matter. Eggs of bugs (hemiptera), together with some adults, formed by far the greater part of the winter food, with beetles and lepidoptera next. In the spring adult beetles and adult lepidoptera were more important. The number of plant-louse eggs was not so noticeable as we should have expected, but in four stomachs the scales of the oyster-shell bark-louse were found, the total number of scales being 77, each of which had probably covered fifty or seventy-five eggs.

In this connection we might add that twice during the spring of 1906 the writer observed the Chickadee eating scale insects, once the elm scale (*Chionaspis americanus*) and again a species of *Lecanium* which is common on the basswood. In both cases the Chickadee was so intent upon his work that he refused to leave until approached within arm's length, and then returned to finish his meal as soon as the intruder withdrew. It is more than probable that it eats to a greater or less extent all the common scale insects which occur on our forest trees and fruit trees, and Mr. E. H. Forbush, State Ornithologist of Massachusetts, has demonstrated by actual experiments that fruit trees to which the Chickadees are baited in winter are never attacked to any serious extent by the canker-worm, tent caterpillar, or other fruit tree pests which may ravage orchards in the immediate vicinity. By hanging up bones to which a little meat adheres, and here and there a bit of suet or fat fresh pork, these little birds may be attracted to any orchard during the cold weather and will come day after day for months, not only feasting upon the food so provided, but in the intervals gleaning from the branches and twigs of surrounding trees every insect and egg hidden there.

Normally the Chickadee nests in deserted woodpecker holes, cavities in decayed limbs or rails, or similar hollows in fence posts, but in many cases it has been induced to accept artificial nesting places, and occasionally it occupies bird boxes intended for wrens or Bluebirds. With a little forethought and care anyone might persuade the Chickadee to nest in his own orchard or garden, and by judicious feeding in winter might do much to protect his trees and shrubbery from some of the more serious insect pests. Frequently it digs the hole for its own nest, choosing a partly decayed stub or branch and pecking out the hole much as a woodpecker does, but with infinitely more pains and patience. It is not able to excavate sound wood, but in wood which is just beginning to decay it often makes a very neat hole, which serves for a year or two. In the bottom of the hole it builds a very compact and nicely felted nest of fur of various kinds, feathers, moss, and cottony plant fibres, and lays from six to ten nearly white, brown-spotted eggs, which average .60 by .47 inches.

The eggs are usually laid, in the southern part of the state, during the first half of May, and from one to three weeks later in the northern sections. The Chickadee is often said to rear two broods, but we have no data which warrant such an assertion. The bird escapes many of the enemies which pillage the nests of other species, but it must meet with misfortune occasionally and in such cases a second nest may be prepared and another attempt be made to raise a brood.

The ordinary call-note of the Chickadee is well expressed by the syllables composing its name, the song being commonly written chickadee-dee-dee-dee, dee-dee-dee, the number of syllables being very variable. Occasionally it utters a series of twittering or almost warbling notes, but these are seldom loud, and hardly long enough continued to constitute a song. A more characteristic song, if it may be called such, is a clear, liquid, penetrating whistle, consisting of but two notes which suggest the syllables pee-wee, the second note being a tone or a half tone lower than the first. This peculiar note is uttered more or less at all times of the year, but much more often between January first and June first. It is often spoken of as the "pewee call" of the Chickadee, and has been regarded by many as its nesting song or the note peculiar to the breeding season. As a matter of fact it is uttered most freely and persistently on clear cold mornings in earliest spring, in February and March, long before the birds have begun preparing their nests, and so far as can be observed, before they have even chosen their mates. This call is often mistaken by the beginner for the note of the Phœbe or Pewee, and many observers have recorded the arrival of the Pewee at northern stations early in March or even in February, when in reality the note heard belonged to the Chickadee.

Except during the nesting season Chickadees are almost always found in little family parties of eight or ten, these occasionally uniting with similar parties so that thirty or forty may be found scattered through the woods within hearing of each other. With such a party are often found one or two Downy Woodpeckers, a pair or two of White-breasted Nuthatches, from two to six Golden-crowned Kinglets (particularly if there are many evergreens in the vicinity), and occasionally a Brown Creeper, a Red-bellied Nuthatch and a Hairy Woodpecker. Such a troup of winter birds roam leisurely through the woods and orchards in search of food, probably keeping together almost the entire day and undoubtedly deriving much satisfaction from each other's company.

TECHNICAL DESCRIPTION.

Adult: Entire upper surface of head, from bill to nape, black; sides of head and neck white; chin and throat black; back, wings and tail clear gray or ash, the wings with an indistinct whitish bar, and most of the wing and tail-feathers white-margined on the outer web; breast and belly white or grayish-white, the sides more or less tinged with brown or buff. Sexes alike, and no great difference between winter and summer plumages.

Length 4.75 to 5.75 inches; wing 2.50 to 2.75; tail 2.50 to 2.70.

314. Carolina Chickadee. Penthestes carolinensis carolinensis (*Aud.*).
(736)

Synonyms: Southern Chickadee.—Parus carolinensis, Aud., 1834, and of most other authors.—Parus atricapillus var. carolinensis, Coues, 1873, and others.

According to Ridgway this species may be readily distinguished from the common Black-capped Chickadee "by the more solid and extensive black on the throat; by the absence of distinct white edgings on the wing and tail-feathers, and by the tail being decidedly shorter than the wing.

Distribution.—Southeastern states, north to New Jersey, Illinois, and west to Missouri.

In summer this is the common Chickadee of southern Illinois and Indiana, and even in the northern parts of these states it is found occasionally mingled with the northern form, *atricapillus.* It doubtless occurs in Michigan with more or less regularity, but mainly or entirely along the southern border of the state. According to Dr. Gibbs, Dr. Atkins of Locke, Ingham county, met with this species in that vicinity at least once, but no specimen appears to have been preserved, and we do not know who was the authority for its identification. Mr. B. H. Swales took a specimen July 17, 1899, in a small woodland in Ecorse township, Wayne county, Mich., which he believes to be the first bird of the species taken in the state (Auk, XXIII, 1906, 342). G. A. Stockwell's Forest and Stream list includes this species, but we do not know on what authority. Dr. Miles also included it in his list (1860).

Probably this species will be found at rare intervals in summer throughout the southern tier of counties, but in its general habits, note, nesting and food it is so nearly identical with the common Chickadee that it is almost sure to escape recognition except by the trained observer who is familiar with the bird in the south, or by the collector who kills every specimen about which he has any doubt.

Nehrling states that in the south (Texas), where he has studied this species, "The bird seems to prefer (for nesting places) hollow horizontal boughs, with the orifice on one side or beneath; but if these cannot be found the bird is satisfied with any cavity, provided its opening is not too large. The nest always consists of a mass of very soft substances, such as moss, fine bark strips, cotton, and especially hair and pieces of rabbits' fur." The eggs average .57 by .45 inches, and except in size are not distinguishable from those of the Black-capped Chickadee.

TECHNICAL DESCRIPTION.

Head without crest, its top and the throat black; no white superciliary streak; sides and flanks light brownish.

"Adult: Wing .20 inch longer than tail; tertials and greater wing-coverts without distinct whitish edgings; black of throat with an abruptly defined posterior border. Above uniform grayish; beneath white medially, light buffy brownish laterally (paler in summer); length 4.25 to 4.60 inches; wing 2.40 to 2.60; tail 2.10 to 2.50" (Ridgway).

315. Hudsonian Chickadee. Penthestes hudsonicus hudsonicus (*Forst.*).
(740)

Synonyms: Hudsonian Titmouse, Hudson Bay Chickadee, Hudson Bay Titmouse.—Parus hudsonicus, Forst., 1772, and most authors.—Parus hudsonicus stoneyi, A. O. U. Committee, 1889.

Figure 149.

Similar in size and general coloration to the common Chickadee, but the top of the head clear brown instead of black, and the stripe on the side of the head pure white only in front, decidedly ash-gray on the neck.

Distribution.—Northern North America, from the more elevated parts of the northern United States (northern New England, northern New York, northern Michigan, etc.) northward.

The Hudsonian Chickadee must be counted as a rare bird in Michigan. The older writers reported it as common in the Upper Peninsula, but

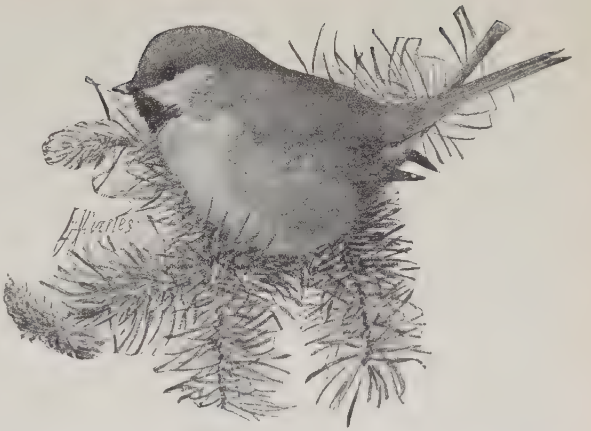

Fig. 149. Hudsonian Chickadee. From Coues' Key to North American Birds, 5th Edition, 1903. Dana Estes & Co.

more recent observers have failed to verify this statement. Cabot's list of 1850 includes it, and G. A. Stockwell, in his Forest and Stream notes on Michigan birds, says: "Found abundantly in the Upper Peninsula and around Mackinac; rarer in the Lower Peninsula; occasionally seen in St. Clair and Lapeer counties; possibly further south" (F. & S., Vol. 8, No. 17, p. 261). This is entirely contrary to our own experience, and very few of our observers or correspondents have reported it in recent years. Mr. O. B. Warren of Palmer, Marquette county, in 1898 wrote "Am doubtful of any authentic record of this bird's capture, as the ground has been worked over where this bird was formerly reported, and since it is a resident where generally found, I think it highly improbable that it ever wandered to Michigan. Kumlien and Hollister state that it is a rare winter visitant in southern Wisconsin, and that Dr. H. V. Ogden of Milwaukee "saw several and shot one in Iron county (Michigan), but unfortunately did not preserve the skins" (Birds of Wisconsin, p. 125). In response to a request for further information Mr. N. Hollister wrote, February 7, 1905: "Regarding this species there can be no doubt of its occurrence in Michigan. I have seen it myself in Vilas county, Wis., near the Michigan line, and Dr. Ogden of Milwaukee has taken it since, he tells me, in the northern tier of counties (Wis.), and now has a specimen or specimens."

More positive testimony comes from Mr. E. A. Doolittle of Painesville, Ohio, who states that he found a pair in a tamarack swamp near Negaunee, Marquette county, Michigan, in June 1905, and is positive that the birds had a nest or young in the immediate vicinity. In 1906 Mr. Walter C. Wood, of Detroit, spent the time from November 10 to December 5 on the Cheneaux Islands in northern Lake Huron, off the shore of Mackinac county, and during this time took several specimens of the Hudsonian Chickadee, which were preserved for his collection. He says: "They appeared with the first heavy snowfall, November 25, when a few were seen. They became very common by the 28th, and Captain Pollock informs me that they are the most abundant winter bird and very tame, in fact more so than *atricapillus*, and more often come about the house and feed from the door-step (Wilson Bulletin, No. 58, March, 1907, p. 27).

In March 1909 we received a specimen of this bird from Mr. E. E. Brewster, of Iron Mountain, Dickinson county, which was taken in the immediate vicinity. This gives us three positive records for as many different counties, all in the Upper Peninsula.

Apparently there is no reason why this species should not occur regularly in the spruce and hemlock forests of the northern parts of the state, since it certainly occurs in similar latitudes in Ontario, Maine and New Brunswick, but the fact that numerous good observers have failed to find it at all in such situations or elsewhere in Michigan seems to prove conclusively that it is not generally distributed. The writer has spent some time in two different years in the Upper Peninsula, near Marquette, about Munising, at Grand Marais, Alger county, at Sault Ste. Marie and in Mackinac county, but in spite of careful search for the bird was unable to find a single specimen. These visits, however, were both in late summer. Mr. T. L. Hankinson, who spent several weeks in Houghton county in August 1905 says: "I looked constantly for the Hudsonian Chickadee, but did not find any, although I was near enough to a good many Chickadees to see the color of the crown, which in all cases was black." This species is not mentioned in the manuscript report of Mr. E. A. Doolittle, who spent several weeks on Grand Island, Lake Superior, in the summer of 1906.

Mr. Outram Bangs, writing of this bird at Digby, Nova Scotia says: "Here the Hudsonian Chickadee is rather hard to shoot * * * keeping almost exclusively in the thick second growth spruce and fir woods, but in a day's walk through their favorite haunts I never failed to see less than 25 or 50, and often many times that number. In October and November they are in large loose flocks in company with the Common Chickadee and the Golden-crowned Kinglet, and often the spruce woods seem fairly alive with these birds, always in motion, always passing on and on through the spruces so fast that it is impossible to keep up with them. Often while walking through these dense forests of evergreens, suddenly as if by magic the trees about one become alive with these three species, their cheerful notes sounding from every branch, and the next moment as suddenly as they came, they will disappear again and leave the forest still and gloomy as before. * * * In August and September 1880 my brother, E. H. Bangs, was camped on the Restigouche River, N. B., and found the Hudsonian Chickadee quite abundant all along the river. He got a good series of them without difficulty."

Dr. C. W. Townsend, who studied this species somewhat carefully on Cape Breton Island in August and September, 1905, speaks as follows of the song: "It is as easy to distinguish this bird by its notes from the familiar Black-capped Chickadee, as by its plumage. * * * Both chickadees have a variety of faint notes that are very much alike, but there is one characteristic in most of the notes of the Hudsonian which at once distinguishes it from the Black-cap, and that is the z quality, delivered in a lower pitch. In a word, the Hudsonian uses z while the Black-cap uses s or d. The former says *pst zee-zee* or less often *pst zee-zee-zee*, while the latter repeats more frequently, and rattles off, *psik, a dee-dee-dee-dee-dee*, and his notes are higher pitched. Several times in different places I was treated to a pleasant little warble from the Hudsonian Chickadee, which appeared to my companion and myself to easily merit the name of song. It was a low, bubbling, warbling song, which I vainly tried to describe in my notes. It began with a *pstt* or *tsee*, followed by a sweet but short warble * * * quite different from the irregular rolling notes that the Black-cap occasionally emits" (Auk, XXIII, 1906, 178).

The nesting habits of this bird appear to be quite similar to those of the Black-capped Chickadee, the nest being placed in a deserted woodpecker hole, or a hollow dug out of the decayed wood by the bird itself, and the nest built mainly of fur of various quadrupeds, particularly rabbits and mice. The eggs are six to eight, similar to those of the common Chickadee and average .58 by .50 inches.

TECHNICAL DESCRIPTION.

Adult: Very similar in size and color to the Common Chickadee but with the upper surface of the head, from bill to nape, dark brown, or brownish gray instead of black; the feathers of wings and tail slightly, if at all, edged with white; sides of the belly also more distinctly brown or rufous.

Length 5 to 5.75 inches; wing 2.35 to 2.70; tail 2.30 to 2.80.

Family 72. SYLVIIDÆ. Kinglets and Gnatcatchers.

The three species of this family which are found in Michigan are, next to the hummingbird, our smallest and daintiest examples of feathered life. The two species of kinglet and the single gnatcatcher may be separated as follows:

A. Middle tail-feathers black, lateral tail-feathers largely pure white. Blue-gray Gnatcatcher. No. 318.
AA. Tail without any clear black or white. B, BB.
    B. Crown with bright yellow, or orange, or both. C, CC.
        C. Crown with a central patch of yellow or yellow and orange, with a clear black border on each side. Golden-crowned Kinglet (adult). No. 316.
        CC. Crown with a central patch of scarlet, but with no black. Ruby-crowned Kinglet (adult male). No. 317.
    BB. Crown without any bright patch. D, DD.
        D. Each nostril overhung by a single small bristly feather. Golden-crowned Kinglet (young). No. 316.
        DD. Each nostril overhung by a tuft of small, bristly feathers. Ruby-crowned Kinglet (adult female and young). No. 317.

316. Golden-crowned Kinglet. Regulus satrapa satrapa *Licht.* (748)

Synonyms: Golden-crested Kinglet, Golden-crowned Wren, Flame-crest.—Regulus cristatus, Vieill., 1807, Nutt., 1832, Aud., 1834.—Sylvia regulus, Wils., 1808.—Regulus satrapa, Licht., 1823, and most subsequent authors.

Figure 150.

One of our tiniest birds, only about four inches in length, and the adult known at once by the general olive-green upper parts and whitish under parts, the crown mainly yellow, in the center of which, in the male, is a stripe or patch of flame-color (orange red). The female lacks this orange, the crown being clear yellow, and in both sexes the yellow is bordered by black lines. Young birds lack the bright crown, but may be identified by the small size and the other points already noted.

Distribution.—North America generally, breeding in the northern and elevated parts of the United States and northward, migrating south in winter to Guatemala.

This is one of the most restless of our birds, as well as one of the smallest, and is sure to attract attention from its manner of flitting quickly about among the foliage, often hovering suspended in the air at the tip of a branch or beneath a pine cone, from which it picks out some minute insect and then darts away to devour it. It is rarely seen during midsummer, in most parts of the state, but is abundant during the spring and fall migrations and a considerable number commonly linger through the entire winter in regions where evergreens are fairly abundant. We have never known a winter when this species was not present on the campus of the Agricultural College, and sometimes a half dozen or more may be found in company with chickadees, nuthatches and woodpeckers.

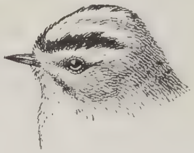

Fig. 150. Golden-crowned Kinglet. From Hoffmann's Guide. Houghton, Mifflin & Co.

We have never heard it sing, but it has a high, almost piercing call of four or five notes which it utters very frequently, and which is characteristic, but difficult to describe. Owing to its presence all winter in favorable localities the exact date of spring arrival is difficult to determine, but there is a marked increase in numbers about the first of April, and sometimes for a few days the birds are present in companies of twenty or thirty, though never in compact flocks. Mr. B. H. Swales says: "March and April are the months of its greatest abundance near Detroit and it seldom remains later than May third." He also states that it arrives from the north late in September, remaining until November first, and that it is a irregular winter resident. A specimen was killed on Spectacle Reef Light, Lake Huron, April 12, 1890, and specimens were killed on the same light October 1, 1890, October 2, 1887, October 5, 1889 and October 5 and 6, 1890; one was killed on Big Sable Light, Lake Superior, October 1, 1894.

The Golden-crowned Kinglet is a summer resident in a considerable part of northern Michigan, but apparently is nowhere abundant at that season. S. E. White states that at Mackinac Island it was "a common summer resident among the evergreens" in 1889, 1890 and 1891; and the University of Michigan expedition found it common in the forests of the Porcupine Mountains, Ontonagon county, in the summer of 1904. According to Mr. N. A. Wood "young in the down were taken July 2, 1904, and it was abundant among the hemlocks in flocks, both young and adults, from July 13 to August 12. It has been reported as not uncommon during the nesting season in several places in the Upper Peninsula, and there can be little doubt that it nests in favorable places not only in the Upper Peninsula but in the higher parts of the Lower Peninsula, wherever pines, spruces and hemlocks are abundant.

Our only actual records of nesting however are those secured by the University of Michigan Expedition to Isle Royale, in 1905. Mr. Max M. Peet records the observations as follows: "Very common throughout the island, usually in small flocks of 15 to 20. They were never shy and their song was one of the most common sounds of the forest. July 6 a pair was seen with food in their mouths and gave every indication that they had young near. July 7 a pair was seen building a nest in a tall spruce. The birds were gathering the moss from the ground for nesting material. The nest was placed about twenty-five feet from the ground and was composed of green mosses partially lined with a white down-like substance. The site chosen was near the top of a small rocky hill where the forest was not very dense. The nest was nearly finished and was suspended from two limbs near the trunk of the tree. When next examined, July 21, it contained eight eggs. It was now composed of green ground moss, together with the long gray strands of the tree lichen, and was lined with fur from the Northern Hare. Its dimensions were four inches deep, and four inches in diameter, with a circular opening one and one-half inches in diameter. In the balsam-spruce forest near camp we found a nest containing six young August 10. The structure was placed about thirty feet from the ground and five feet from the top of a tall, slender spruce. Both parents were carrying small moths and other insects to the young. This was a late nest, as young Kinglets had been seen early in July. The nest was suspended from a couple of small limbs, was composed of gray lichen and green moss, lined with Northern Hare fur, and was considerably larger than the nest previously described, the outside depth being about six inches" (Adams, Rep. Mich. Geol. Surv., 1908, p. 383).

Kumlien and Hollister state that "The Golden-crowned Kinglet breeds along the south shore of Lake Superior in Ontonagon county, Michigan" (Birds of Wisconsin, p. 125), but we are informed by Mr. Hollister that this statement is based solely on the statements of the late Professor Kumlien, and no specific instance is recorded. Mr. William Brewster found the species nesting in Worcester county, Mass., in June 1888, and secured three nests, two of which contained nine eggs each. These nests were placed on or in the horizontal branches of spruces, 50 or 60 feet from the ground, and not far from the tops of the trees. They were composed of green mosses and grayish lichens, lined with delicate strips of inner bark and fine black rootlets, to which were added numerous feathers of the Ruffed Grouse, Hermit Thrush, Oven-bird and others. The nests were open at the top, but deeply hollowed and so over-arched by feathers about the rim of the nest as to almost conceal the eggs.

These were cream-colored, thinly sprinkled, or speckled with markings of pale brown and lavender, over the entire surface but most thickly at the larger ends of the eggs, the markings so pale, however, that some of the eggs appeared to be unspotted. They average about .56 by .45 inches. Mr. Brewster states that "in both nests the eggs, too numerous to find sufficient space for their accommodation in the bottom of the nest, were piled in two layers one above the other. In the second nest there were five eggs in the lower and four in the upper layer. In the first nest the number of eggs in the two layers was not noted" (Auk, Vol. V, 1888, p. 341). Mr. Brewster describes the song as follows: "The song begins with a succession of five or six fine, shrill, high-pitched, somewhat faltering notes, and ends with a short, rapid, rather explosive warble. The opening notes are given in a rising key, but the song falls rapidly at the end. The whole may be expressed as follows: tzee, tzee, tzee, tzee, ti, ti, ter, ti, ti, ti, ti" (Auk, V, 1888, 343).

The food of this bird consists almost entirely of insects and their eggs, and it cannot be doubted that it is decidedly beneficial to the farmer and fruit grower. It is often seen eating plant-lice and is a common bird in the orchards during migration, on such occasions spending much time about the opening buds and among the terminal twigs where it collects large quantities of harmful insects.

TECHNICAL DESCRIPTION.

Adult male: Most of the upper parts olive or grayish olive, brighter on the rump; crown with a central patch or stripe of brilliant flame-color, or orange, on either side of which is a stripe of clear bright yellow, bounded on the outside by a stripe of black; a white line over the eye; two white wing bars, and most of the wing and tail-feathers edged with yellowish white; under parts uniform grayish white. The adult female is almost precisely similar, except that the bright crown patch is yellow without the central orange stripe. The young of the year show neither yellow nor red on the crown, and often little or no trace of the black stripes.

Length 3.15 to 4.50 inches; wing 2.10 to 2.25; tail, 1.60 to 2.

317. Ruby-crowned Kinglet. Regulus calendula calendula (*Linn.*). (749)

Synonyms: Ruby-crowned Wren, Ruby-crown.—Motacilla calendula, Linn., 1766, and most authors.—Sylvia calendula, Wils., 1808.

Similar to the Golden-crowned Kinglet except for the crown, which in the adult male is plain olive-green with a dash of ruby-red or scarlet vermilion, without any stripes of black or white. Young birds and adult females have the crown plain and can be separated from young Golden-crowns only by the expert.

Distribution.—North America, south to Guatemala; north to the Arctic coast, breeding chiefly north of the United States, and in the Rocky Mountains, the Sierra Nevada, and the mountains of Arizona.

This beautiful little Kinglet is universally distributed throughout the state as a spring and autumn migrant, but probably is not found within our limits during the nesting season. It differs from the Golden-crowned Kinglet in that it appears to be strictly a migrant, not even a single individual lingering here through the winter. It arrives from the south in April and may linger for several weeks, departing for the north by the middle of May and returning in September and October. Before the first of November the last seem to have moved south. The only spring record from a lighthouse is that of an individual killed on Spectacle Reef Light May 5, 1889. One struck Big Sable Light, Lake Superior, October 7, 1893 and one Pt. Aux Barques Light, Lake Huron, October 17, 1890. It appears to be much more common in spring than in fall, yet this is probably due to the fact that it is much more musical in spring and its movements cover a shorter time so that the birds are concentrated and more conspicuous.

The ordinary note while migrating is a high pitched "tsee" repeated two or three times, but frequently the bird utters snatches of its summer song, which is a rich, varied warble, interspersed with clear whistles, the whole being remarkably loud for so small a bird. It frequently appears in considerable numbers late in April, and not infrequently twenty or thirty individuals may be found in company flitting restlessly about among the bare twigs, calling loudly to each other and moving rapidly from tree to tree. At this time, as always, they are feeding exclusively on insects and their eggs and thus doing an immense amount of good.

The species is not readily distinguished from the other Kinglet unless it happens to hang head downward or expose the ruby color of the crown. In the autumn the two species sometimes occur together and then birds of the year are practically indistinguishable.

The nest and eggs of the Ruby-crowned Kinglet are not separable with certainty from those of the Golden-crown, but while the latter bird in all probability nests frequently in northern Michigan, the present species usually passes north of our limits and we have little reason to believe that it ever nests in this state. Several observers report it as a summer resident, and Mr. S. E. White states that he found a nest with four newly fledged young on Mackinac Island July 20, 1889; it seems quite probable however, that the nest found was that of the Golden-crown. The nests found in Colorado and Montana are described as very bulky, half pendant, and composed of mosses, bark strips, feathers, fur and similar soft materials, and placed near the ends of pine or spruce branches at some little height from the ground. The eggs are said to be eight or ten in number, of a dirty cream color, more or less spotted, but the spots quite faint, as in the case of the Golden-crowned Kinglet. The eggs average .55 by .43 inches.

TECHNICAL DESCRIPTION.

Adult male: Upper parts grayish olive, with a yellowish tinge on the rump; crown with a small patch of bright red; under parts yellowish or grayish white; two light (yellowish white) wing-bars and wing and tail-feathers usually edged with yellowish. The adult female and the young of the year are similar except that they lack the red patch on the crown.

Length 3.75 to 4.60 inches; wing 2.20 to 2.30; tail 1.85 to 1.90.

318. Blue-gray Gnatcatcher. Polioptila cærulea cærulea (*Linn.*). (751)

Synonyms: Gnatcatcher, Common Gnatcatcher, Blue-gray Flycatcher.—Motacilla cærulea, Linn., 1766.—Muscicapa cærulea, Wils., 1810.—Culicivora cærulea, Jardine, 1832.—Polioptila cærulea of most authors.

Another tiny species, rivaling the kinglets in daintiness. The upper parts are clear bluish-gray, deepest on the head, lightest on the rump, the under parts almost white, merely tinted with bluish. Middle tail-feathers black, outer two pairs mostly white. The male has a narrow black line across the forehead and over each eye, which the female lacks.

Distribution.—Middle and southern portions of eastern United States, south in winter to Guatemala, Cuba and the Bahamas; rarely north to the Great Lakes, southern New York and southern New England, accidentally north to Massachusetts and Maine. Breeds throughout its United States range, and winters from the South Atlantic and Gulf States southward.

This bird is a summer resident of southern Michigan, and, during some years and in some places, is fairly abundant; during other years hardly seen at all. As a rule it seems to be confined to the three southernmost tiers of counties, yet it is not uncommon about Grand Rapids, has been reported from the neighborhood of Port Huron, St. Clair county, and there are several records from points still farther north. Wood & Frothingham record it seen in Crawford county, August 10, 1903, and Mr. S. E. White shot one and saw another on Mackinac Island September 22, 1889. This species appears never to have been killed at any Michigan Lighthouse. In Ontario, according to McIlwraith, the Gnatcatcher is limited to the southwest border, north of which it has never been observed; and in Wisconsin, according to Kumlien & Hollister, it is common only in the southern tier of counties, except "along Lake Michigan, where it is found in few numbers as far north as Manitowoc county" (about 44°).

It arrives from the south late in April, the earliest date at Ann Arbor in twenty-five years being given as April 4, 1895, and the average time of arrival as the fourth week in April (N. A. Wood). At Petersburg, Monroe county, Mr. Trombley's earliest record was April 15, 1898, and the average time of arrival about April 24. In Ingham county it is rarely seen before the last two or three days of April and many times has not been noticed before the 6th or 7th of May. The southward migration doubtless begins in August and is completed in September, few being seen after the middle of that month.

While with us it shows a decided preference for the higher parts of large trees, and is especially partial to white oaks, in which the nest is most often built; however, it frequently descends to the lower branches of the trees and may sometimes be found in shrubbery, but rarely on the ground. It is extremely restless and active, moving from branch to branch with a quick jerky flight, keeping the wings half spread, the tail often elevated and in motion, while it utters a variety of high-pitched, squeaky and wheezy notes which are highly characteristic, but not loud enough to be heard at any great distance. During the nesting season, and occasionally at other times, the bird utters a very sweet warble which Coues describes as, "a sweet and tender song, so low as to be inaudible at any considerable distance, yet so faultlessly executed and well sustained that the tiny musician may claim no mean rank in the feathered choir." Nehrling says "The song bears some resemblance to the Catbird's but is of course much lower and softer, not perceptible at a distance."

The nest is begun very soon after the birds arrive on the nesting grounds. In one instance we found a pair building a nest near the Agricultural College, Ingham county, on May 8 (1897), but this is unusually early, although Dr. Gibbs took a set of four eggs in Kalamazoo county May 5, 1877. As a rule nests with eggs are most often found during the last week in May and the first week in June, and there seems to be no reason to suppose that a second brood is reared.

The nest is one of the most beautiful built by any bird, being composed of various soft vegetable downs, largely from the milkweed and thistle but bound together by spiders' webs and possibly by the birds' saliva, and the outside completely covered with bits of moss and lichens in the manner of the Hummingbird. It is almost invariably built on a horizontal branch and at a considerable height from the ground, often forty or fifty feet, but is occasionally placed in the fork of a branch, or more rarely still in an upright fork near the top of the tree itself. It has an external diameter of about two inches and usually a height of more than three, and is so deeply hollowed that the female is able to conceal herself almost completely, only the tip of the tail being visible when she is sitting.

The eggs are four to six, bluish or greenish-white, speckled with reddish brown, and average .56 by .43 inches.

The food of this species appears to be much like that of the kinglets, consisting entirely of insects and their larvæ, pupæ and eggs. Were it an abundant bird it would be invaluable to the fruit grower, but its small numbers, and the fact that it is never numerous in the orchards, somewhat detract from its economic value. Dr. Gibbs says: "This is one of those species which have seasons of special abundance and again are very rare. It was very abundant from 1876 to 1881 and again from 1889 to 1893 in Kalamazoo county, but it is now (1904) scarce here, and two of us have only recorded three specimens in the last two seasons."

TECHNICAL DESCRIPTION.

Adult male: Upper parts bluish-gray, the top of the head lead-blue, with a black line in front and along both sides; under parts mainly white, shaded with gray on the sides; outer tail-feathers white. The adult female is similar, except that it lacks the black line on the head.

Length 4 to 5.50 inches; wing 2 to 2.20; tail 2 to 2.20.

Family 73. TURDIDÆ. Thrushes, Bluebirds, etc.

A family of beautiful birds, including some of the most familiar birds of garden and orchard, as well as several delightful songsters not so well known. The seven species which occur regularly in Michigan, together with an eighth for which there is a single doubtful record, may be separated by means of the following artificial key. It should be remembered that every member of the family has the first primary very short, never more than one-fourth as long as the longest.

KEY TO SPECIES.

A. Under parts, at least the breast, with spots. B, BB.
  B. Back with narrow whitish streaks or spots. C, CC.
    C. Upper surface of wings and tail tinged with blue. Bluebird (young). No. 325.
    CC. Upper surface of wings and tail without trace of blue. Robin (young). No. 324.
  BB. Back without any whitish streaks or spots. D, DD.
    D. Color of upper surface uniform (brown) from head to tail. E, EE.
      E. Upper parts light (tawny) brown; chest tinged with the same color and lightly spotted. Wilson's Thrush. Veery. No. 20.
      EE. Upper parts dark (olive) brown; chest heavily spotted. F, FF.
        F. Cheeks brown or buffy. Olive-backed Thrush. No. 322.
        FF. Cheeks gray. Gray-cheeked Thrush. No. 321.
    DD. Color of upper surface not uniform. G, GG.
      G. Head and back uniform olive; tail deep rufous. Hermit Thrush. No. 323.
      GG. Rump and tail olive, head bright rufous. Wood Thrush. No. 319.
AA. Under parts not spotted. H, HH.
  H. Breast red-brown. I, II.
    I. Upper parts with more or less blue. Bluebird (adult). No. 325.
    II. Upper parts without any trace of blue. J, JJ.
      J. Tail largely white with a broad black band across its tip. Wheatear. (Appendix.)
      JJ. Tail largely blackish, only the two outer pairs of feathers with white near tip. Robin (adult). No. 324.
  HH. Breast white or merely tinged with yellowish-brown. Wheatear. (Appendix.)

319. Wood Thrush. Hylocichla mustelina (*Gmel.*). (755)

Synonyms: Song Thrush, Wood Robin, Bell Bird.—Turdus mustelinus, Gmel., 1789, and most authors until 1880.—Hylocichla mustelina, Ridgw., 1880, and most recent authors.—Turdus melodus, Wils., 1808.

Plate LXIX.

Largest of the small thrushes and the only one which is heavily spotted on the sides as well as the breast with large round dark spots. In addition the upper parts are reddish brown, brightest on the head and back, the tail paler.

Distribution.—Eastern United States to the Plains, north to southern Michigan, Ontario, and Massachusetts, south in winter to Guatemala and Cuba. Breeds from Virginia, Kentucky and Kansas northward.

The Wood Thrush is an abundant summer resident of southern and middle Michigan, but appears to be somewhat local in its distribution; in some places it is entirely unknown, while half a dozen miles away it may be abundant. As a rule it seems to prefer an uneven country, with abrupt ridges and valleys, and it shows a decided preference for hardwoods and the vicinity of small streams, being rarely found in the evergreen forests and seldom in level regions. In spite of the fact that the bird is generally considered a southern species, there is some evidence to show that it occurs, at least occasionally, in nearly the whole of Michigan, being absent entirely only from the northernmost parts of the Upper Peninsula.

Up to the parallel of 44° it may be considered a fairly common summer resident in suitable locations, yet Mr. Newell A. Eddy, after many years of careful observation in various parts of the Upper Peninsula, states that he has never found it in that region. On the other hand, Dr. Gibbs found it abundant in beech and maple woods about Howard City, Montcalm county, in 1882 and 1883, Chaney records it from Mason county in 1909 (Auk, XXVII, 1910, 278), and Dr. R. H. Wolcott found it in summer in Charlevoix county, though not in numbers. Wood & Frothingham found it common in Oscoda county July 4 and 15, and a single one was seen in Crawford county September 9. Mr. Stewart E. White states that it was not present on Mackinac Island in the summer of 1889, but was a common summer resident there in 1890 and 1891. Miss H. H. Wright reports parent birds feeding young in Iosco county the last of June, 1907. Mr. F. H. Chapin has seen it in Emmet, Cheboygan and Charlevoix counties in August and September, while on the other hand Mr. Otto Widmann, during a two week's residence in Emmet county in July, failed to find the bird, and the writer, who spent June, July and August 1904 in Emmet and Charlevoix counties, did not obtain the slightest evidence of its presence. There is a single lighthouse record, a specimen having been killed on Spectacle Reef Light, Lake Huron, May 21, 1885, and Brewster and Dwight took specimens near Cadillac, Wexford county, and Oden, Emmet county, in May 1888. Dr. W. H. Dunham states that in Kalkaska county he has found several nests of this species every year, and says: "In fact, I believe they breed here as abundantly as in Wayne county, Oakland county or Ottawa county" (August 1906).

The records from the Upper Peninsula are less satisfactory, yet it seems hardly possible that all observers who report this species can be entirely

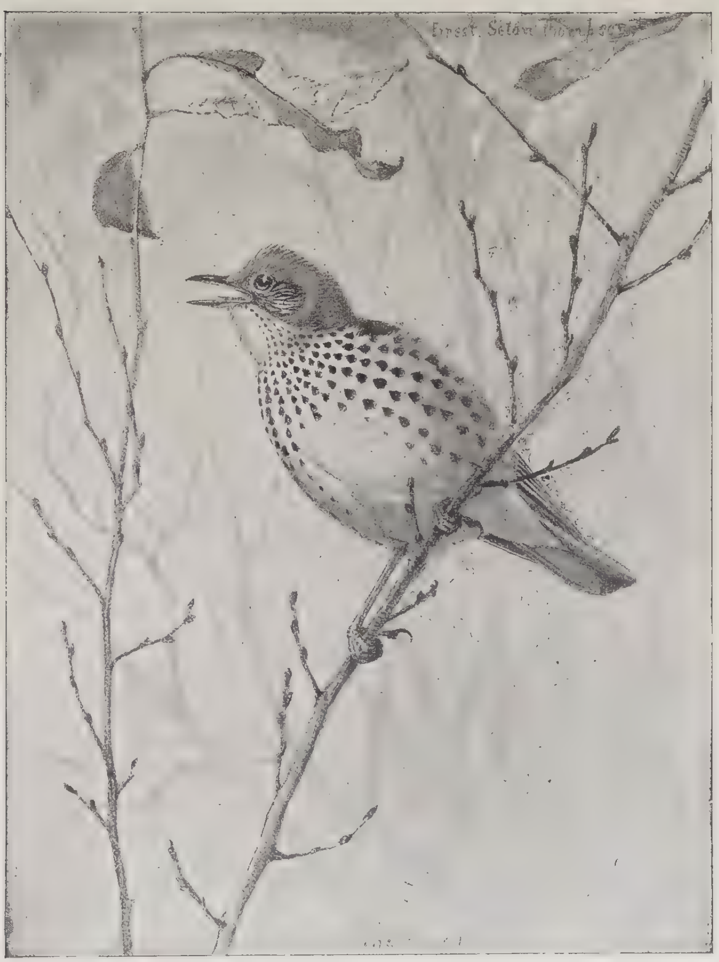

Plate LXIX. Wood Thrush.

Reprinted from Chapman's Bird Life.

By courtesy of D. Appleton & Co.

mistaken. Major Boies states that on Neebish Island, St. Mary's River, it is occasionally seen during the summer and probably breeds. Kneeland includes it in his list of the birds of Keweenaw Point, Lake Superior (1856-57), and Miss Flora L. Mowbray of Marquette states that it is quite common there and nests; she also states that Dr. Elliott R. Downing of the State Normal School has found the bird in that vicinity. Mr. Thomas B. Wyman of Negaunee, also states that it is a common summer resident in hardwood lands in that vicinity. On the other hand, Mr. O. B. Warren of Palmer, Marquette county, who formerly recorded the species from that region, states that it should not be included in his list. The writer has spent considerable time on two different trips to various parts of the Upper Peninsula east of Marquette, and in spite of most careful search has failed to find this species. The Olive-back and Hermit Thrush were heard and seen repeatedly, but the Wood Thrush never.

The bird usually reaches the southern border of Michigan during the last week of April, Mr. Trombley's dates at Petersburg ranging from April 25, 1886 and April 22, 1891 to May 2, 1893 and May 5, 1897. At Ann Arbor Norman A. Wood gives the average for twenty-five years as the first week in May, the earliest date being March 21, 1889, which must be considered an exceptional date, if not actually a mistaken identification. Farther north the Wood Thrush appears during the first two weeks in May, according to latitude, and probably by the 15th of May has reached all parts of the state where it commonly nests. It does not always begin to sing immediately upon arrival, but much depends upon the weather.

The song once heard is not likely to be mistaken for that of any other bird except the Hermit Thrush, but according to the writer's experience it *is* usually confounded with the song of that bird. Descriptions of the song vary widely and are far from satisfactory. Most writers consider it inferior to that of the Hermit Thrush, but there is room for a difference of opinion on this point. Chapman says "When excited his usual call-note, *pit-pit,* is regularly repeated until it resembles the sound produced by striking large pebbles together, quite unlike the whistled *wheeu* of the Veery. * * * The songs of the Wood and Hermit Thrushes are of the same character, but while the Hermit is the more gifted performer the Wood Thrush does not suffer by the comparison. His calm, restful song rings through the woods like a hymn of praise, rising pure and clear from a thankful heart." Nehrling says: "It loves the deep half-darkness of the forest solitude with its peace and quietness. Here we can hear the wonderful, harmonious, flute-like song from early dawn till evening twilight. Were it not for hearing repeatedly the far-sounding, delightful *eolie hallalee* one would hardly know that this famous vocalist had returned home again. Besides this common song-like call it utters a low tuck or tack and a quickly reiterated *tuck-tuck-tuck-tuck.*" According to Bicknell it has no second song period, but sings well until near the end of July, then less often and with less vigor until August 6 to 15th, when the song ceases abruptly" (Auk, I, 128).

The Wood Thrush moves southward during September, and although a few may be found in October, the majority have left the state considerably before the middle of that month.

Professor Forbes, summing up the results of his examination of the stomachs of this bird in Illinois, says: "Eating nearly as many ants as the Catbird, as many caterpillars as the Robin and Hermit Thrush, it falls below all the other species in the ratio of predaceous beetles, runs above them all in wire-worms and thousandlegs, but eats scarcely any scavenger beetles. Only 19 percent of its food was fruit, and all but 7 percent of this was wild. It would apparently well repay generous encouragement."

We have no more beautiful songster or more lovable bird than this in the state. Its song should commend it to the nature lover and its food habits to the agriculturist. It is not likely ever to become superabundant and there is reason to believe that it has been steadily decreasing in numbers for the last two decades.

The nest of the Wood Thrush is placed commonly in the triple fork of a small sapling, on the horizontal branch of a low tree, or in a tangled mass of bushes and vines, usually four to twelve feet from the ground, more rarely at a height of fifteen or twenty. It is built of sticks, leaves, bark and mud, and almost invariably lined more or less completely with fine roots. Most writers state that the nest is held together with mud, but in many cases this certainly is not true, the mud being merely an inner shell or lining upon which the incomplete lining of roots is laid. Many nests contain very few roots and we have frequently found the eggs laid directly upon the mud or upon a little mat of roots at the bottom of nest, the surrounding mud walls being entirely naked. Mr. James B. Purdy of Plymouth has called our attention to the fact that in his vicinity the "mud" used is entirely of vegetable origin, being in reality a pulp made of partly decomposed forest leaves which are molded into shape much as paper pulp is worked.

The eggs are almost invariably three or four, one about as often as the other. They are of the same shade as the Robin's, greenish-blue, unspotted, and not with certainty distinguishable from those of the Robin, although they average somewhat smaller. Ridgway gives the average as 1.04 by .72 inches. The nest is rarely hidden, and owing to its size and lack of concealment is often robbed by Crows, Jays and boys, so that the bird is sometimes compelled to build several nests, but there is no reason to suppose that more than a single brood is reared in a season.

TECHNICAL DESCRIPTION.

Adult male: Upper parts, including wings and tail, clear reddish-brown, reddest on the head, most olive on the tail; under parts white, heavily spotted with black, the throat and belly alone lacking spots. Sexes alike.

Length 7.50 to 8.25 inches; wing 4 to 4.50; tail 3 to 3.30.

320. Veery. Hylocichla fucescens fucescens (*Steph.*). (756)

Synonyms: Tawny Thrush, Wilson's Thrush, Nightingale.—Turdus fucescens, Steph., 1817, and most subsequent authors until 1880.—Hylocichla fucescens, Ridgw., 1880, and most recent authors.—Turdus wilsonii, Bonap., 1824, and some others.

All the thrushes are commonly recognizable from their general resemblance in form to the common Robin, while their colors are soft olives and browns above and whitish below, the throat and breast more or less spotted with brown or black. The largest of our thrushes, the Wood Thrush, is decidedly smaller than the Robin, and the present species, the Veery, is still smaller. The beginner will experience great difficulty in separating the smaller thrushes, but the Veery may be characterized as the palest of them all, both above and below, with a distinct buffy tint on the throat and upper breast, while the spots on the breast are paler and more scanty than in any other species.

Distribution.—Eastern United States to the Plains, north to Manitoba, Ontario, Anticosti, and Newfoundland. Breeds from northern New Jersey and the northern part of the Lake States northward: winters sparingly in Florida, but chiefly south of the United States.

A delightful songster, common as a migrant throughout the entire state, and a common summer resident of all except the southernmost counties. Even in these counties it can hardly be called a rare summer resident, since its nest has been found repeatedly in Wayne, Washtenaw, Monroe, Lenawee and Hillsdale counties, and it doubtless nests sparingly in the remaining counties of the southernmost tier. On the other hand it is a characteristic summer bird of our northern forests, and is found everywhere along the south shore of Lake Superior, as well as on Isle Royale.

It enters the state from the south about the first of May, in early seasons a week earlier, occasionally considerably later. Mr. Swales gives his earliest spring record at Detroit as April 22, 1900, and his latest, May 4, 1902. At Ann Arbor Norman A. Wood gives April 16, 1889 as the earliest record for twenty-five years, and its average appearance the first week in May. It nests from the middle of May to the middle of June, according to latitude, and commonly places the nest upon the ground or very close to it, usually in low or at least damp situations. The nest is frequently found at the base of a clump of alders or willows, not infrequently among the "water sprouts" which start from the side of a stump, occasionally on a log, or even on the top of a stump, while instances are recorded of its location at a height of four or five feet from the ground, in a bush or tree.

Ordinarily the nest is very bulky, built of leaves, moss and rubbish, which forms a solid foundation, the nest proper being formed of leaves and grasses, with a few roots, but without any mud. It is deeply hollowed and often more or less hidden from above, but in many cases the eggs would be decidedly conspicuous when not covered by the parent. The eggs vary from three to five, but are usually four, and are pale blue and unspotted, averaging .85 by .67 inches. Very rarely a few specks of brown may be found on them, and there are a few records of eggs which were fairly well sprinkled with brown dots; as a rule, however, they are entirely immaculate.

This bird gets most of its food from the ground, and since it frequents woodlands almost exclusively during the nesting season, its work is not of any great value to the farmer or fruit grower. Like all thrushes it feeds largely upon beetles, snails, myriapods and a great variety of insects, eating small fruits freely whenever obtainable. In the case of the present species, however, the fruit eaten is almost all wild fruit, and the bird cannot be considered in any way injurious.

The song of the Veery is one of the sweetest and most remarkable to be heard in our summer woods. Seton Thompson says: "The song is a high-pitched whistle, yet rich and clear, with a rippling cadence like a little brook. It seems almost profane to represent this faint, soft, silvery tinkling by uncouth syllables, yet I think the best idea of the mere articulation may be suggested by the syllables *veero, veery, veery, veery,* from which no doubt the singer got his name" (Birds of Manitoba, p. 633). Ridgway describes the song as "An inexpressibly delicate metallic utterance of the syllables ta-weel-ah, twil-ah, twil-ah, accompanied by a fine trill." The metallic quality of the song is usually very noticeable, and the fact that it is heard oftenest at twilight, and often has a distant effect even when the bird is quite near, renders it particularly attractive. There is little likelihood of confounding this song with that of other thrushes; the nearest approach to it is seen in the imperfect spring song (during migration) of the Olive-back, but this latter is an inferior performance as compared with the nuptial song of the Veery. Bicknell says: "Often it does not sing for several days after arrival from the south, sometimes not until two weeks after the Wood Thrush is heard. It stops singing early in July, 10th to 15th, being rarely heard later."

TECHNICAL DESCRIPTION.

Adult: Upper parts, including wings and tail, uniform pale reddish-brown; below mainly white, the throat and breast slightly buff-tinted; middle of throat, belly, and sides, white; the sides of the throat and most of the upper breast spotted sparingly with pale brown. The sexes alike.

Length 6.50 to 7.75 inches; wing 3.75 to 4.15; tail 2.75 to 3.25.

321. Gray-cheeked Thrush. Hylocichla aliciæ aliciæ (*Baird*). (757)

Synonyms: Alice's Thrush.—Turdus aliciæ, Baird, 1858, and most authors until 1880.—Hylocichla aliciæ, Ridgw., 1880, A. O. U. Committee, 1899, and most recent writers.

The Gray-cheeked Thrush resembles the Olive-back, and differs from other members of the genus, in having the entire upper parts, head, back, wings and tail, of the same shade of olive-brown; it differs from the Olive-back in having the cheeks clear gray and in lacking a distinct light ring about the eye; it is also slightly larger.

Distribution.—Eastern North America, west to the Plains. Alaska and eastern Siberia, north to the Arctic coast, south in winter, to Costa Rica. Breeds chiefly north of the United States.

The Gray-cheeked Thrush is one of our less common thrushes, and indeed was hardly known to the earlier observers. It occurs during migration only, not being known to nest within our limits. In habits it does not differ noticeably from the Olive-back, with which it is most often associated, and with which it is frequently confounded.

It arrives from the south from the last of April to the middle of May, but the reports from observers throughout the state are neither sufficiently abundant nor accurate to determine the time of arrival with much certainty. The identification of this bird by the unaided eye, by the field glass, by note, or by action, is entirely unsatisfactory; records based on anything less than the actual capture of specimens must be disregarded. The few unquestionable records which we have would seem to indicate that it arrives somewhat later than the Olive-back and moves southward in the fall a little earlier. Mr Swales states that near Detroit it is "a not uncommon migrant. Arrives April 27—May 21, again in September. First taken here in 1898 by J. Claire Wood." Mr. S. E. White records one specimen taken on Mackinac Island August 23, 1891, and W. Wilkowski took one at Kalamazoo May 13, 1904. Perhaps the most satisfactory records are those afforded by the lighthouses, as follows: Killed on Spectacle Reef Light, Lake Huron, May 22 and May 24, 1890, May 23, 1897, June 1, 1892, September 21, 1890, September 25, 1899 (2 specimens); on Presque Isle Light, Lake Huron, September 15, 1890; Port Oneida Light, September 25, 1886; Big Sable Light, Lake Superior, October 7,

1893. These records are all based on specimens forwarded by the light keepers and identified by the Division of Biological Survey, Washington, D. C. It was found on Isle Royale as a migrant only in 1905, on September 5, and again September 12 and later. Norman A. Wood found it abundant on the Charity Islands, Saginaw Bay, September 14 to October 10, 1910. It is by no means rare about the College (Ingham Co.), where specimens are taken almost every May and September.

According to Bicknell "The song of the Gray-cheeked Thrush commences low and reaches its loudest, and I think its highest, part a little beyond half its continuance. It is throughout much fainter and of less forcible delivery than the song of the Olive-backed species" (Auk, I, 1884, 130).

The nest and eggs of the Gray-cheeked Thrush (not likely to be found in Michigan) are not distinguishable with certainty from those of the Olive-back. The nest is placed in low bushes or trees (rarely on the ground), and the eggs are greenish-blue, spotted with rusty brown, and average .92 by .67 inches. The ground color is said to be of a decidedly deeper blue than in the Olive-back.

TECHNICAL DESCRIPTION.

Adult: Upper parts uniform olive-brown from top of head to tip of tail; sides of head grayish, and without any well marked eye-ring; throat and belly white, the former often tinged with buff; sides of throat and entire breast with arrow-shaped spots of brown and black. Sexes alike in size and color.

Length 7 to 7.75 inches; wing 3.75 to 4.40; tail 2.95 to 3.40.

322. Olive-backed Thrush. Hylocichla ustulata swainsonii (*Tschudi*). (758a)

Synonyms: Swainson's Thrush, Swamp Robin.—Turdus swainsoni, Tschudi, 1845 and most authors until 1877.—Turdus ustulatus swainsoni, Ridgw., 1877.—Hylocichla ustulata swainsoni, Ridgw., 1880, and most recent authors.

Entire upper surface clear olive, as in the Gray-cheeked Thrush, but a distinct buffy eye-ring and the cheeks not gray but buff. The throat and chest are also much more buffy than in the Gray-cheeked Thrush.

Distribution.—Eastern North America and westward to the Upper Columbia River and East Humboldt Mountains, straggling to the Pacific coast. Southward in winter to Cuba, Guatemala, Nicaragua, Columbia, Ecuador and Peru. Breeds in the northern Alleghanies, the Catskills, the mountainous parts of southern New England, southern Sierra Nevada and northward.

The Olive-backed Thrush is a much more common migrant in Michigan than the preceding species. It arrives from the south about the first week in May, somewhat earlier in the southern part of the state in favorable seasons, and much later, even the last week of May, in the Upper Peninsula. Thrushes are among the birds most frequently killed at lighthouses and there are scores of records for the present species from the Michigan lights. The earliest spring record is from Spectacle Reef Light, May 10, 1888, and the only record from Detroit River Light is May 15, 1886. The numerous spring records from Spectacle Reef are mostly included between May 20 and June 1, but there is a single record of May 17, 1885, and one of June 2, 1889. Fall records from the same Light range from September 9, 1894 to October 20 of the same year, but the majority of records fall between September 20 and October 10. The records at Big Sable Light, Lake Superior, are June 6, 1894, September 3 and 5, 1889 and September 13, 1890. There is also a record from Marquette Light, Lake Superior, May 22, 1886, and another from Grand Island Light, Lake Superior, September 16, 1890.

Occasionally the Olive-back appears in large numbers in spring and lingers for two or three weeks, frequenting the edges of woods, parks, and gardens, and being very familiar and unsuspicious. At such times its song is frequently heard, especially toward the latter part of its stay, but apparently it never reaches the perfection shown on its breeding grounds. The species has been confounded so frequently with the other small thrushes that many of our reports of its nesting are likely to be incorrect, yet it is certain that the bird nests not infrequently in the higher parts of the Lower Peninsula and more regularly in many parts of the Upper Peninsula.

We have a nest and four eggs in the College collection taken in Wexford county, in July 1875, by J. H. Deming, and Dr. W. H. Dunham reports finding a nest with three fresh eggs June 5, 1899, on the north branch of the Manistee River, in Kalkaska county. Dr. Gibbs reports a nest of three eggs taken May 25, 1887, at Groverton, Houghton county, and the University of Michigan expedition found a nest of two eggs in Ontonagon county July 26, 1904. Mr. T. B. Wyman reports a nest of three fresh eggs taken at Negaunee, Marquette county, July 10, 1905, and E. A. Doolittle found it nesting freely on Grand Island, Alger county in 1906. In Dickinson county during the summer of 1895, Mr. E. E. Brewster, of Iron Mountain, found four or five nests, but failed to secure eggs, as they were invariably destroyed before the completion of the sets. Mr. Stewart Edward White states that the species was a common summer resident on Mackinac Island in the summers of 1889, 1890 and 1891, and nested. Max M. Peet gives the following account of its nesting on Isle Royale in the summer of 1905: "July 8 a nest was found at Rock Harbor on a horizontal spruce limb about five feet from the ground. It was about four feet from the tree trunk and was quite conspicuous. The tree stood at the edge of a small rock opening. The nest was composed principally of dead grasses with moss and the long thread-like tree lichens woven in. Rootlets and leaves formed the lining. It contained three very young birds" (Adams Rep. Mich. Geol. Surv., 1908, p. 334).

These records show that the species has a wide distribution in the northern half of the state during the nesting season, but the southern limit of this nesting range has not been properly defined. We have records of the nest near Ann Arbor and also in Kalamazoo county, but in both cases there was possibility of mistake, since the parent birds were not taken.

This species lays spotted eggs and invariably nests in bushes or trees, while it is assumed that neither the Wilson's nor Hermit Thrush nests in trees nor lays spotted eggs. Instances are recorded, however, in which both the last named species have nested in bushes and trees, and occasionally spotted eggs are laid. It seems, therefore, not improbable that abnormal nests of some other species may have been mistaken in these two instances for those of the Olive-back.

According to Spencer Trotter: "The song of the Olive-backed Thrush seemed to me [in Nova Scotia] to be inferior to that of the Hermit Thrush; it starts out well, but is finished in a series of squeaky notes. * * * When disturbed it utters a metallic note, short, sharp, often ending in a curious, rolling, querulous call. * * * I have several times mistaken these short, pucking notes for the alarm calls of the Ruffed Grouse to her scattering brood" (Auk, XXI, 1904, 63). According to Bicknell, the song of the Olive-back as compared with that of the Gray-cheeked Thrush is "louder, more spontaneous and lyrical. Almost the first note is the loudest and most liquid, after which the melody becomes rapidly finer, seeming to dissolve upon the air like the spent vibration of a stringed instrument."

Mr. Stewart Edward White gives a minute description of the singing of this bird as observed on Mackinac Island, Lake Huron, in the summers of 1889, 1890 and 1891. He says "The song begins low and ascends by two regular steps of two notes each and ends with several sharp notes. The first note of each step is higher than the second and the second of the next is about the same as the first note of the first step. Occasionally the whole is preceded by a sharp *chuck*. The notes have the swelling beauty of all thrush songs, while the metallic ending rings like a little bell. The song always says to me, *gurgle gurgle ting, che che che*. As far as my experience goes this thrush never sings steadily except in his chosen tree. * * * He sings on an average nine and a half times a minute with extreme regularity." From observations during the summer of 1891 Mr. White found that one Olive-back began on an average at 3:15 a. m. and sang steadily about ten times a minute until about 9 a. m.; then he was nearly silent until noon, after which he sang occasionally for a minute or so. About 4:30 he began again and only ceased, to retire for the night, about 7:30 p. m. "Allowing but eight times a minute for his songs, we have for one day, the time consumed in song periods, about eight hours and forty-five minutes, and in occasional song, at least twenty minutes, according to which there would be a total of 4,360 songs per day. His song ceased entirely about July 25, although for five days before that but half the time was employed. Certainly it would not be unfair to allow him at the very least six weeks of song, 42 days at 4,000 per day, in all 168,000 songs in a season. The above facts have been many times verified" (Auk, X, 1893, 230).

The nest is said to vary much in character according to location, but is placed at a height of six to twenty feet from the ground, and in Michigan is usually in an evergreen tree and not infrequently on a horizontal branch. It is built largely of twigs, moss, and strips of bark, but leaves sometimes enter into the construction and fine rootlets are used almost invariably for the lining. Mud has never been reported and probably is not used. The eggs are commonly three or four and are light greenish-blue, spotted with rusty brown, and average .90 by .65 inches. They are of a lighter blue than those of the Gray-cheeked Thrush and the spots are usually rather numerous and perfectly distinct. But one brood appears to be reared in the season.

The food is similar to that of the other small thrushes and the larger part of the animal food at least, comes from the ground, where the birds search busily for it, turning over fallen leaves, probing the moss and decayed vegetation and picking up worms, snails and insects of various kinds, particularly beetles and ants. Six specimens, taken in Illinois in April and May, were examined by Prof. S. A. Forbes, who found 22 percent of crane-flies, 28 percent of ants, 5 percent of predaceous beetles, several curculios, and in one stomach a mass of short-horned borers, *Scolytus muticus*, (Trans. Ill. State Hort. Soc. Vol. 13, 1879, p. 138). The Olive-back is fond of wild fruits of all kinds and eats large quantities of berries in their season. Being an inhabitant of woodlands rather than orchards or gardens, it does no damage to the horticulturist, but on the other hand renders little service to him except during its transient visits on the trip north or south.

TECHNICAL DESCRIPTION.

Adult: Entire upper parts, including wings and tail, rather dark olive; lores and ring around the eye buff; throat and breast tinged with buff; sides of throat with wedge-shaped black spots, the breast with rounded black spots; middle of the belly white; sides brownish-gray or brownish-ashy. Sexes alike in size and color.

Length, 6.50 to 7.50 inches; wing 3.75 to 4; tail about 3.

323. Hermit Thrush. Hylocichla guttata pallasi (*Cab.*). (759b)

Synonyms: Rufous-tailed Thrush, Solitary Thrush, Swamp Robin.—Turdus pallasii, Cabanis, 1847, Baird, 1858, Allen, 1871, B. B. & R., 1874.—Turdus solitarius, Wils., 1812, Aud., 1839, and others.—Turdus minor, Vieill., 1807.—Turdus nanus, Aud., 1839 (part). —Hylocichla guttata pallasii, Howe, 1901.—Turdus aonalaschkæ pallasii, A. O. U. Check-list, 1886.

Plate LXX and Figures 151, 152.

Similar to the Olive-back and Gray-cheeked Thrushes, but the upper parts not uniform olive, except on head and back, the rump and tail being deep reddish-brown. The breast also is more heavily spotted than in any of the other thrushes except the Wood Thrush.

Distribution. –Eastern North America, breeding from the northern Alleghanies, the mountainous parts of southern New England, southern New York, northern Michigan, etc., northward, and wintering from the northern states southward.

The Hermit Thrush is by far the most abundant of the small thrushes during migration, sometimes appearing in great numbers and always to be found commonly in early spring, and again in the fall. It is the earliest of the small thrushes to arrive from the south, usually appearing during the first or second week in April, almost always before the middle of that month in the southern part of the state. Mr. Trombley's dates at Petersburgh, Monroe county, range from April 7, 1893 to April 18, 1886, the average being about April 10. At Ann Arbor Mr. Wood's earliest record in twenty-five years is April 2, 1904, the average being the second week of April. At Bay City and at Grand Rapids the species arrives at about the same time, April 7 to April 15, and even at Palmer, Marquette county, it was recorded by Mr. O. B. Warren April 10, 1893 and April 29, 1895. Specimens were killed on Spectacle Reef Light, Lake Huron, May 5, 1889 and June 1, 1892, and a single one October 3, 1893. One was killed on Big Sable Light, Lake Superior, May 18, 1891. The southward movement in autumn doubtless begins in September, but is most marked during October, and the last do not leave the state until the first of November or even later.

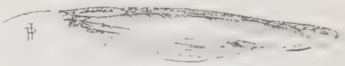

Fig. 151. Wing-tip of Hermit Thrush, showing spurious first primary. (Original.)

Although an abundant migrant throughout the entire state it does not nest in the southern counties nor, with rare exceptions, in any counties south of the Saginaw-Grand Valley. There are several reports of nests found in the southern part of the state, but in most cases these doubtless were nests of the Veery. Dr. Gibbs and Mr. W. A. Gunn secured a nest

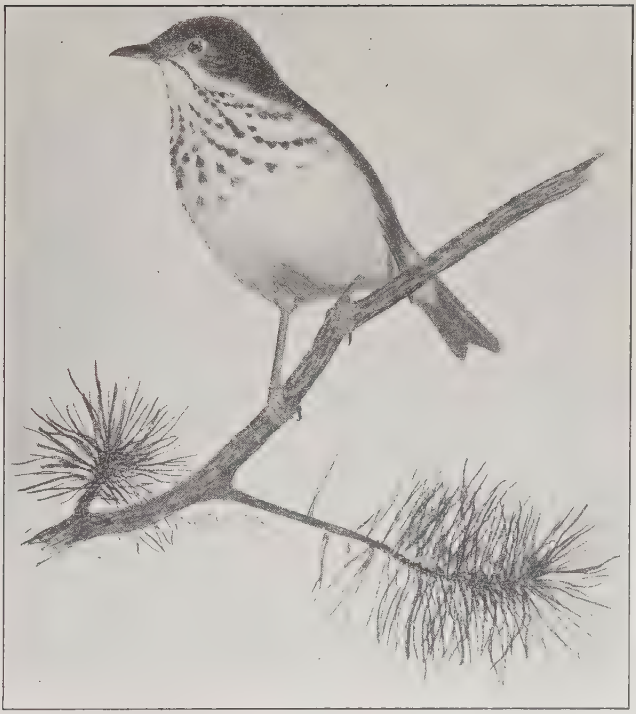

Plate LXX. Hermit Thrush.

From an original drawing by W. F. Jackson.

of three fresh eggs in Ottawa county May 20, 1879, taking the female for positive identification. There is a nest and three eggs in the Agricultural College collection taken by Gunn and Gibbs, marked Ottawa county, May 31, 1879, possibly the same nest. Dr. Gibbs found the species in Montcalm county, near Howard City, where he took a nest June 10, 1882 and was satisfied that they nested in abundance. Dr. R. H. Wolcott found it common at Charlevoix in dense pine woods where it was undoubtedly breeding. The writer found it nesting in Emmet county in the summer of 1904, and it was abundant and in full song on the Beaver Islands, Lake Michigan, in July of the same year. S. E. White states that it is an abundant summer resident on Mackinac Island, Lake Huron, and Dr. W. H. Dunham took a nest and three eggs near Spencer, Kalkaska county June 5, 1906, but does not consider it common in that vicinity.

Throughout the Upper Peninsula it appears to be a common nester, although Mr. E. E. Brewster of Iron Mountain, Dickinson county, states that he has never found it nesting there, and does not think it is a summer resident. Mr. Ed Van Winkle of Vans Harbor, Delta county, states that it breeds there, and we have numerous reports of its nesting in Marquette county, Alger county, Chippewa county, and Mackinac county. Mr. T. B. Wyman found a nest and four fresh eggs at Negaunee, Marquette county, July 7, 1905, and Mr. E. O. Doolittle found nests with eggs from June 13 to 24, 1905 in Baraga and Marquette counties. The occurrence of fresh eggs on July 7 makes it likely that the species occasionally rears a second brood.

In habits the Hermit Thrush is much like the Olive-back, and although during migration they are by no means shy, during the nesting season they are extremely wary and suspicious, and it is difficult to approach within gun shot while they are singing. The Hermit Thrush obtains most of its food from the ground and its nest is invariably placed upon the ground or close to it, but when singing it often selects a perch thirty to fifty feet high and sings for an hour at a time from this point. In common with several of its relatives the Hermit has the habit of lifting the tail suddenly and allowing it to sink slowly down again, to be quickly lifted an instant later, this being repeated over and over again, while the bird utters a low *chuck* from time to time, which is rather characteristic although not widely different from that used by the Olive-back.

The song has been so often described that most readers are familiar with it. Mr. Burroughs says: "It is to me the finest sound in nature." Spencer Trotter says: "The Hermit's song appealed to me as a sustained melody throughout; as though the musician had the ear to appreciate as well as the power to express. * * * The alarm note has a catbird quality about it, lower pitched and less metallic than that of the Olive-backed Thrush" (Auk. XXI, 63-64). Bicknell says: "The call-note of the Hermit Thrush is very different from that of any other species of its group which occurs with us. It is a low *chuck*, suggestive of the note of a distant blackbird (Auk, 1, 131). Dr. Coues says of the song "The weird associations of the spot where the Hermit triumphs, the mystery inseparable from the voice of an unseen musician, conspire to heighten the effect of the sweet, silvery, bell-like notes, which, beginning soft, low and tinkling, rise higher and higher to end abruptly with a clear, ringing intonation. It is the reverse of the lay of the Wood Thrush, which swells at once into powerful and sustained effort, then gradually dies away, as though the bird were receding from us."

In spite of all that has been said and written about the song of the Hermit Thrush the writer fails to discover any superiority over that regularly given by the Wood Thrush. We have heard the Hermit Thrush hundreds of times and in scores of places, and, making due allowance for time and place, the song in our opinion is neither clearer, purer, sweeter, more powerful or longer continued than that of the Wood Thrush. Individuals of either species sometimes excel the average musician of the other species, but we doubt that as a whole one can be said to be superior to the other.

As already stated the nest is almost always placed on the ground and is not ordinarily distinguishable from that of the Veery or Wilson's Thrush. It is built largely of leaves, but grasses, weed-stems, bark and roots are also used freely and occasionally pine needles and other evergreen leaves are added. The eggs are three to five, greenish-blue, unspotted, and average .88 by .66 inches.

The food does not differ particularly from that of its near relatives, but consists very largely of insects, together with some spiders and myriapods, and with a considerable amount of small-fruits in their season. Prof. Forbes found that 87 percent of its food in Illinois, as ascertained by the dissection of 16 specimens taken in April and May, consisted of insects, and the only unfortunate feature of its food was that it included 12 percent of ground beetles (Carabidæ).

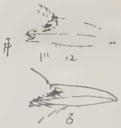

Fig. 152. Hermit Thrush (a) and Bluebird. (b).

TECHNICAL DESCRIPTION.

Adult: Entire upper surface (except tail) uniform olive-brown; tail and upper coverts brighter reddish-brown (rufous), in strong contrast; sides of throat and entire breast spotted with brown or black, the spots smallest and sharpest on the sides of the throat, growing larger, rounder and paler on the lower breast; throat and middle of belly white; sides olive, unspotted. Sexes alike in color and size.

Length, 6.50 to 7.50 inches; wing 3.40 to 3.90; tail 2.50 to 3.

324. Robin. Planesticus migratorius migratorius (*Linn.*). (761)

Synonyms: Common Robin, Robin Redbreast, Red-breast, Migratory Thrush, Canada Robin, Northern Robin, American Robin.—Turdus migratorius, Linn., 1766, and most American writers until about 1880. Merula migratoria, Sw. & Rich., 1831, Ridgw., 1880, A. O. U. Check-list, 1886, and most subsequent authors. Planesticus migratorius, Gundlach, 1871.

Above gray; darker, often nearly black, on the head; under parts mainly reddish-brown except the throat, which is white, streaked with black, and the belly, which is white and unspotted; outer tail-feathers white-tipped.

The Robin, being our most familiar bird, should be carefully studied by the beginner. It serves as a convenient standard of size for comparison with other species, and measures from nine to ten inches from tip of bill to tip of tail, being thus much larger than it looks.

Distribution.—Eastern United States to the Rocky Mountains, including eastern Mexico and Alaska. Breeds from Virginia and Kansas northward to the Arctic coast; winters from southern Canada and the northern states (irregularly) southward.

Probably our most abundant, best known and generally best loved native bird. It stays with us the larger part of the year, being common during summer throughout the entire state and some individuals commonly spend the winter in the southern half of the Lower Peninsula. Such individuals commonly retire to swamps or evergreen thickets, or make their homes in parks and private grounds, where good shelter and a fair supply of food may be found, and undoubtedly the birds noted earliest in spring are often these which have wintered in the vicinity, or possibly a little farther south. On the first approach of warm weather they become conspicuous and often begin to sing, so that reports of spring Robins are frequent in February and occasionally in January. While such instances are of most frequent occurrence in the southern half of the Lower Peninsula they are by no means confined to that section, and we have trustworthy accounts of the wintering of individual Robins in many of the northern counties, even a few from the Upper Peninsula. As an instance of this we may quote part of a letter dated March 5, 1909, from Mr. E. E. Brewster, of Iron Mountain, Dickinson county. He says: "I have been interested in watching a pair of robins, evidently young of this year, which have made their home with us the past winter. When my attention was first drawn to them there were three, but about Christmas one disappeared. The other two, apparently male and female, judging from the different coloration, were seen almost daily until February 1st when the food supply failed in my immediate neighborhood, and they were no longer regular visitants. One or both were seen at intervals, however, until February 14. Later I saw two feeding on sumac berries near the Pewabic Mine, about three-fourths of a mile east from my house. The last I saw of either was February 23d, when I saw one in the sumac bushes. This speaks pretty well for our winter climate when Robins can winter here (45° 50′ north). The early part of the winter they fed on mountain ash berries, but Pine Grosbeaks and Bohemian Waxwings finally cleared out the supply."

During mild winters considerable numbers of robins sometimes remain in the state, but ordinarily the van-guard of the migrating host reaches southern Michigan between March 1st and 15th, although in some seasons they are abundant in the latter half of February and numbers keep coming from the south until the first of April. Even in the Upper Peninsula Robins appear in considerable numbers early in April, often several weeks before the ground is free from snow. It is a matter of common remark that they become much more abundant with the clearing and settling of a region, yet the species is by no means unknown in the wildest parts of the state, and in open grounds, for example, the pine barrens in the northern half of the Lower Peninsula, or the bare spaces left by forest fires, Robins are almost if not quite as plentiful during the summer as in the more thickly settled regions to the south. During migration they travel in flocks of considerable size, and they often pass the winter in such companies. The southward migration begins in September, but the greater number linger until October, and large flocks may be seen every year until late in November.

Nesting begins very early, always in April in the southern part of the state, and occasionally during the last week in March. In the vicinity of Lansing, Ingham county, the first nests with eggs may usually be found about the middle of April, and the first young leave the nests about the middle of May (May 14, 1901, May 15, 1897). A second brood is almost invariably reared, the young leaving the nest about the first of July, but nests with eggs are often found late in July, or even in August, indicating third broods. In 1900 a brood of young left a nest on the College campus, Ingham county on August 7, and many nests still had young in them during the last week in July. Since the nests are almost always conspicuous and are frequently robbed by Blue Jays, Crows and human enemies, the birds are often compelled to make several attempts before a single brood is reared, and this postponement of the normal second brood undoubtedly accounts in most cases for these late nests.

The nest is built largely of grass, roots and mud, but an immense variety of substances may be used, and materials of all sorts are occasionally found in the same nest. Ordinarily, however, few twigs are used, and the nest is almost invariably well lined with fine grasses, which completely cover the mud which forms so large a part of the structure. Normally nests are placed in trees at heights varying from three or four feet to fifty or sixty feet from the ground, but they are frequently placed upon buildings, bridges, fence-posts, rails, as well as in sheds, barns, outbuildings, and occasionally on ledges of rocks or even on roots or stones jutting out of banks of sand or clay. More rarely nests are found on brush heaps, or low stones in open fields or along the borders of woods, and instances are recorded in which the nest has been placed directly upon the ground. The eggs vary in number from three to five, the commoner number being four, and they are of the well known "robin's-egg-blue," without spots, and average 1.15 by .78 inches.

Before the young of the last brood are out of the nest, in fact, usually before the first of August, Robins begin to congregate in large flocks, and these commonly select some safe place in which they roost regularly at night until their departure for the south. Such roosts have not been commonly noted in Michigan, but in other states they have frequently been described and the place selected may be a group of evergreens, a dense bed of reeds in a marsh, or more commonly the thick growth of small willows or poplars in low ground. Two roosts of the latter character have been noted for the past ten years within a couple of miles of the Agricultural College in Ingham county. In all cases the places selected were dense growths of willows and poplars which had sprung up in a marsh which had been burned a year or two previously. Here the Robins gather to the number of several thousand each evening from early August until after the first of November, beginning to congregate about an hour before sunset, but a few birds arriving even after it is too dark to count them. They come singly or in scattered flocks, rarely more than forty or fifty at a time, but from all directions and evidently often from considerable distances. Blackbirds, grackles, and chewinks also frequent the same roost, but in smaller numbers than the Robins. During the day these Robins scatter over a wide area, but are commonly abundant on the college campus during most of the day, and particularly during the latter part of the afternoon.

The song of the Robin is too well known to need description, It is perhaps sufficient to say that there is very great variation in the song, not only with season, but with the individual, some birds having sweeter voices and more extended songs than others. The birds begin to sing very early in the morning, often before the first streak of dawn is visible to the human eye (in June between 3 and 3:30 a. m.), and after the first bird begins it is usually only a few moments before hundreds are singing. Singing continues all through the nest-building period, at least until the very last of July, after which there is a silent interval of a month or more and singing is again resumed in September and October, although by no means generally. The song is a strong, clear, liquid warble, with perhaps no claim to very great beauty or remarkable purity of tone, yet it is after all one of the most satisfactory songs of the summer, and in spite of all criticism the bird has fully earned the place which it has in popular affection. That its call-notes, and particularly its cries of distress and alarm, are harsh and disagreeable cannot be denied, but the bird can hardly be blamed for this fact.

The main criticism and dislike which the bird provokes come from the fact that it is a voracious fruit eater and under some circumstances does a large amount of injury to small fruits. It is particularly fond of cherries, strawberries, raspberries and grapes, but it attacks (at least occasionally) every small-fruit which grows, either wild or cultivated, and is much addicted to pecking into ripening orchard fruits, particularly apples and pears of the earlier varieties. For this reason the fruit-grower comes to detest the bird and can hardly be blamed if he overlooks the benefit which he undoubtedly receives from the good work done in the consumption of insects. However, there is plenty of evidence that the good work of the Robin in this respect is commonly overrated and that where very abundant the mischief done to the fruit grower is by no means atoned for by the injurious insects eaten.

Probably no American bird (with the possible exception of the Crow) has been the cause of so much difference of opinion as the Robin, and at various times its food has been investigated with more or less care by observers of fair ability, after plans not always the most scientific. It is impossible in this place to give even a brief resume of such work, but those interested should consult the writings of Treadwell, Jenks, Slade, Lyle, Wilcox, King, Aughey, Forbes and Beal, references to which are given in the appendix to this volume.

Prof. S. A. Forbes, in his investigations in Illinois, examined the stomachs of 114 Robins collected in various places during the spring and summer months. He examined first the stomachs of 41 Robins collected in March, April, May, June, July and August, and found that 28 percent of the food was fruit while 2 percent of the remainder consisted of spiders and myriapods, and all the rest (presumably 70 percent) was insects. Of these, 20 percent were caterpillars and 7 percent ground beetles (harpalinæ). In addition there were 6½ percent of injurious beetles, including 2½ percent of curculios, 8 percent of orthoptera, and 1½ percent of injurious myriapods, 16 percent in all, to offset 28 percent of fruit, the other elements about balancing each other. "I therefore conclude," he says, "that these 41 Robins taken together had certainly done, just previous to the time of their demise, fully as much harm as good, as far as we can judge from the contents of the stomachs" (Trans. Ill. State Hort. Soc. Vol. 13, 1879, p. 132). The subsequent examination by Prof. Forbes of 73 more Robins' stomachs did not materially change his conclusions, although further investigation convinced him that the ground beetles eaten were not as valuable as had been supposed, and that therefore the Robin was doing comparatively little harm in eating these insects. He concludes: "We can reduce the question finally to about this form: Will the destruction of 17 quarts of average caterpillars, including at least eight quarts of cutworms, pay for 24 quarts of cherries, blackberries, currants and grapes? For my own part I do not believe that the horticulturist can sell his small-fruit anywhere in the ordinary markets of the world at so high a price as to the Robin; provided of course that he uses due diligence that the little huckster doesn't cheat him in the bargain. That is to say, that while the bird is not so precious that we need make it an act of sacrilege to show him the muzzle of a gun in a cherry orchard. * * * on the other hand it would be an enormous blunder to wage ourselves, or to permit others to wage, any general or indiscriminate war against him" (Trans. Ill. State Hort. Soc. Vol. 14, 1880, pp. 111-112).

Study of the food of nine Robins killed in an orchard overrun with canker-worms showed that only three had eaten canker-worms, these forming about one-fifth of their food. Insects formed 93 percent of the food of the nine robins, myriapods 5 percent, earthworms and mollusks the remainder. Cutworms were extraordinarily prominent, forming 28 percent. Half of them were the bronzy cutworm (Nephelodes violans). Coleoptera formed 36 percent, of which 11 percent were click beetles, elateridæ (Bull. Ill. State Lab. Nat. Hist. No. 6, pp. 5-6).

Prof. F. E. L. Beal, of the United States Department of Agriculture, has reported upon the food contained in the stomachs of 330 Robins taken at various times and places, and he states that 42 percent of the entire food was animal matter, chiefly insects, while vegetable matter formed 58 percent of the stomach contents, over 47 percent being wild fruits and only a little more than 4 percent cultivated varieties. During June and July cultivated fruits amounted to upwards of 25 percent. Mr. E. V. Wilcox, of the Ohio Experiment Station, reported in 1891 upon the stomach contents of about 200 Robins taken in Ohio during April, May, June, July and August. He found that the beneficial species of plants and animals eaten by these Robins amounted to 52.4 percent, while the injurious species formed 18.6 percent, and neutral species 28.9 percent.

There is no question that the Robin sometimes does a large amount of good in its consumption of insects, especially by eating cutworms and grasshoppers; it must be remembered, however, that the major part of its insect food is taken from the ground and that hence the Robin is a factor of little importance in limiting the activity of the spanworms and other caterpillars which defoliate our fruit and shade trees. It also eats large numbers of insects which at best are not harmful, and which possibly may be beneficial.

It is a remarkable fact that no extended investigation of the Robin's food, based upon stomach contents, has indicated more than a very small proportion of earthworms, less than 2 percent being the maximum record so far as we can find. On the other hand, it is a matter of common, almost universal, observation that the Robin during spring and early summer, and again for a considerable time in autumn, feeds very largely upon earthworms. The writer has seen a Robin extract from the ground and eat or carry away for its young ten or a dozen worms in as many minutes, and observations made continuously for many seasons here in Michigan have convinced us that the first brood of young under ordinary conditions is reared very largely upon this diet. This is not due to the entire absence of other food, but merely to the fact that the earthworms are abundant, easily obtainable, and in no way objectionable as food for the young or old. This disparity between the results of observation in the field and stomach examination in the laboratory suggests the probability that there is yet much to be learned in regard to the food of the Robin.

It should be noted particularly that in Michigan at the present time it is unlawful to kill Robins at any season; furthermore, it is impossible to shoot Robins which are taking fruit of any kind without serious injury to the trees and vines from which the fruit is taken; and, finally, that the killing of any number of Robins in fruit growing regions will not materially lessen their numbers or protect the fruits from destruction unless the killing is persisted in season after season and is participated in by a great majority of the fruit growers. Complete immunity from the attacks of fruit eating birds can be secured by the use of the net to cover trees and vines. This method is expensive, and in many cases the expense would not be warranted, yet the experiment has been tried profitably in some places and further experiment in this direction is very desirable.

TECHNICAL DESCRIPTION.

Male in summer: Mainly slate-colored above and brownish-red (cinnamon-rufous) below; top and sides of head black; throat white, with narrow black streaks; a white spot over the eye; wing-feathers dark slate, almost black, and tail-feathers quite black, except the outer feather on each side, which has a small white patch near the tip. The female is so similar as to be separated with difficulty; ordinarily the head is not quite so black and the back is rather grayer. The bill in both sexes is yellow, with black tip; iris dark brown. In fall and winter all the colors are duller and most of the feathers above and below have ashy margins. The young are spotted with black on back and breast, most thickly and heavily below.

Length 10 inches or a little less, wing about 5.25, tail 4.25 to 4.50. The sexes are of the same size.

325. Bluebird. Sialia sialis sialis (*Linn.*). (766)

Synonyms: Common Bluebird, Eastern Bluebird, Blue Robin, Blue Red-breast, American Bluebird.—Motacilla sialis, Linn., 1758.—Sylvia sialis, Vieill., 1807, Wils., 1808, Aud., 1834.—Saxicola sialis, Bonaparte, 1826.—Ampelis sialis, Nutt., 1832.—Sialia wilsonii, Swains, 1839.—Sialia wilsoni, Bonap., 1838.—Sialia sialis, Haldeman, 1843, and most subsequent authors.

Known at a glance by the bright blue of the upper parts, including the wings and tail, and the deep cinnamon-brown breast and sides, only the belly and under tail-coverts being white.

Distribution.—Eastern United States to the eastern base of the Rocky Mountains, north to Manitoba, Ontario and Nova Scotia, south, in winter, from the Middle States to the Gulf States and Cuba.

The Bluebird is universally distributed throughout Michigan as a summer resident, and indeed is common during the larger part of the year, since it arrives and departs at about the same time as the Robin, that is, arriving in March and leaving in November, while a few remain in the southern parts of the state during mild winters. Twenty-five years ago this bird was one of the most familiar dooryard birds of the state, nesting in hollow stumps, deserted woodpeckers' holes, or bird-boxes provided for its use, and frequenting almost every orchard and grove in the settled districts, often nesting in the shade trees of city streets and parks. With the advance and abnormal increase of the English Sparrow the Bluebird was driven from its nesting places and compelled to take refuge at a distance from the settlements, where, although compelled to contend with numerous other enemies, it was at least free from the harrassing attacks of the introduced English Sparrow. Fortunately the waste lands which had been abandoned by their owners after the timber was cut off furnished ample accommodations for the nesting of Bluebirds, and throughout these desolate tracts in the northern part of the state the Bluebird has become one of the prominent and enlivening features.

The winter of 1894-95 will be remembered at the south for its deep snows and unparalleled cold weather, and that winter proved fatal to thousands, perhaps millions, of Bluebirds, Robins, and a few other species which normally winter in the southern parts of the United States. The Bluebird gets the larger part of its food from the ground, and although it can subsist for a time upon seeds and berries, is unable to survive indefinitely upon such fare. Hence, when it was overtaken by the severe weather of January, February and March, 1895, the birds perished by the thousand, and for a year or two ornithologists feared that the species might have received a blow which would result in its complete extinction. Fortunately, however, the Bluebirds multiplied rapidly and have again occupied a large part of their previous nesting territory, so that at the present time they are almost as numerous as ever.

The beauty of the Bluebird's plumage, its simple but pleasing warble, and the fact that it returns to us in earliest spring, while the snow still covers the face of the earth and other birds are extremely rare, has endeared it to dwellers in town and country alike, and has rendered it a favorite with all nature lovers. It has no objectionable traits, eats no cultivated fruits (although partial to many wild berries) and is a voracious consumer of insects, of which it eats an immense variety, although perhaps not always with such discrimination as the agriculturist could wish. Undoubtedly, as shown by numerous investigations, it eats an undue proportion of ground-beetles, which are believed to be more or less beneficial; but, on the other hand, it consumes large quantities of caterpillars, cut-worms, injurious beetles, grasshoppers, and other insect foes, the destruction of which is certainly of inestimable value to the farmer.

Prof. S. A. Forbes has recorded the food found in the stomachs of 108 Bluebirds from various parts of Illinois and gives as his conclusions the following: "The injurious insects destroyed include 26 percent of lepidoptera, nearly two-thirds of which were recognized as noctuidæ, 3 percent of leafchafers, and 21 percent of orthoptera, a total of 50 percent on this side of the account. On the other hand, ichneumons amount to 3 percent, the carabidae to 7 percent, soldier-beetles to 1 percent, soldier-bugs to 3 percent and spiders to 8 percent, a total of 22 percent of predaceous and parasitic forms." From what we now know of the food habits of any of these insects it seems certain that even this showing, which was considered unfavorable to the Bluebird, is in reality a very creditable one. The ground-beetles are now known to be much less valuable than was formerly supposed, while the spiders may probably be disregarded altogether. A single Bluebird shot in a canker-worm orchard in Tazwell county, Ill., and examined by Prof. Forbes, had made 60 percent of its meal of canker-worms; the remainder consisted of 4 percent of spiders, one of scavenger beetles, and the rest of predaceous beetles. Prof. Forbes has shown that in March 38 percent of the food of Illinois Bluebirds consists of cut-worms and related caterpillars, while in May moths, caterpillars, Junebeetles and grasshoppers form 55 percent of the stomach contents. Later in the summer, in July and August, locusts, crickets, grasshoppers, moths and caterpillars form its insect food, and little else is eaten except a few wild berries.

On the whole there is no doubt whatever that the Bluebird is a decidedly beneficial species and it should be protected and encouraged whenever possible. Under some circumstances it responds quickly to protection, but when it has once been driven away by English Sparrows or red squirrels it is difficult to reinstate it. Although it may continue to nest in distant orchards and about the edges of woodlands, it still avoids the farm dwellings and village gardens where it was formerly an abundant bird.

The nest, which is generally placed in a cavity of some kind and usually at no great height from the ground, consists of grasses, feathers, and other soft and fibrous materials, and is often built as early as the first week in April, although more often about the middle of the month in the southern half of the state. A second brood is usually reared in June or July and many observers believe that a third brood is occasionally raised. The eggs are four to six, of a clear pale blue, without spots, and average .82 by .64 inches. Occasionally the eggs laid are pure white without any tint of blue, and this seems to be an individual mark, second and third sets from the same birds showing the same peculiarity, and this fact has been used sometimes as proof that the same pair of birds return year after year to the old nesting place.

About midsummer the young of the first brood, with perhaps some of the old birds, collect in loose flocks and remain together until their departure for the south in September and October, being joined before beginning their journey by the old birds and the young of the second broods. At this time they frequent open fields and the borders of woods, where they feed freely upon grasshoppers and other terrestrial insects and also eat considerable quantities of the berries of the various sumacs, as well as wild cherries, elderberries, poke-berries, huckleberries and doubtless many other species.

TECHNICAL DESCRIPTION.

Adult male: Entire upper surface, including wings and tail, bright blue; under parts chestnut or cinnamon-brown, except the belly, which is white. Adult female similar, but the blue above and brown below duller and grayer. In autumn and winter all the blue feathers are tipped with rusty and the brown feathers with gray or white. Young birds at first show blue only on the wing and tail-feathers; the back is marked with dots of silvery or grayish white, and the under parts are whitish, each feather bordered with gray or brown.

Length of male, 6.50 to 7 inches; wing about 4; tail about 2.75. The female is decidedly smaller.

APPENDIX.

APPENDIX 1.

ADDITIONS AND CORRECTIONS.

107-2. Western Willet. Catoptrophorus semipalmatus inornatus (*Brewst.*). (258a)

(Omitted from the body of the work by mistake; belongs between Nos. 107 and 108.)

Synonyms: Pill-willet, Bill-willie.—Symphemia semipalmata inornata Brewster, 1887, A. O. U. Check-list, 1895, and most recent authors.

Similar in general appearance to the Greater Yellowlegs, but larger, lacks the yellow legs, has a much heavier bill, and has a conspicuous white patch on the wing at the base of the primaries, most conspicuous in flight, but visible when the wing is closed.

Distribution.—Western North America. Breeds from central Oregon, southern Alberta, and southern Manitoba south to northern California, central Colorado, southern south Dakota and northern Iowa.

The Western Willet is a decidedly rare species in Michigan, but there are several well attested records of occurrence. At the "overflow" near Ann Arbor, Prof. Jacob Reighard took several "Willets" (at least five) in May, 1889. Unfortunately no entire specimen was preserved, but wings and heads were identified as Willets by Norman A. Wood and others. That these, or the other Michigan specimens referred to, belonged to the western rather than the eastern subspecies is merely an assumption, based on the supposed range of the two forms, which would seem to make the occurrence of the western form most likely. It is perfectly possible, however, that both forms may occur. Dr. Gibbs states that "Two specimens are, or were, in the collection of the Kent Scientific Institute at Grand Rapids, which both Gunn and Hughes aver were killed close to Grand Rapids. I am perfectly satisfied that this was the fact" (Manuscript notes). A careful examination of the above collection, by the writer, in 1905, failed to reveal any specimens whatever of Willet. An egg in the Agricultural College collection (No. 4972) is recorded as taken at Saginaw Bay, by Professor A. J. Cook, but no other data are entered. This egg measures 2.23 by 1.54 inches, and is doubtless genuine, but considerable uncertainty attaches to its origin.

The bird occurs in small numbers in Wisconsin, Illinois, Indiana, Ohio, and Ontario, but appears to be decreasing in numbers, like many other waders, and is likely to become extinct in the Great Lake region before many years.

It formerly nested throughout most of the southern Great Lake region. On its nesting grounds it is described as one of the noisiest of the waders, constantly hovering about the intruder and uttering its loud cries of "pill-willet, pill-willet," from which its common name is derived. It nests on the ground and lays three or four eggs, which are pale buff, spotted with various shades of brown and gray, and average 2.13 by 1.53 inches.

TECHNICAL DESCRIPTION.

Eastern form, C. s. semipalmatus (for comparison).

"Primaries blackish, with nearly the basal half white, producing a very conspicuous patch on the spread wing. Summer adult: Above brownish gray, irregularly varied with dusky; lower parts white, tinged with grayish on foreneck and buff along sides, the former with chest streaked or spotted with dusky, the latter barred with the same. Winter plumage: Above plain ash-gray; beneath immaculate white, the foreneck shaded with grayish. Young: Above brownish gray, the feathers margined with buff or pale ochraceous; sides much tinged with the same, and finely mottled transversely with grayish. Length 15 to 17 inches; wing 7.50 to 9; culmen 1.90 to 2.60; tarsus 1.95 to 2.85" (Ridgway).

Western form, C. s. inornatus. Male and female, breeding plumage:—

"Differing from S. semipalmatus in being larger, with a longer, slenderer bill; the dark markings above fewer, finer, and fainter, on a much paler (grayish-drab) ground; those beneath duller, more confused or broken, and bordered by pinkish-salmon, which often spreads over or suffuses the entire underparts, excepting the abdomen. Middle tail-feathers either quite immaculate or very faintly barred. Measurements: Wing, 7.88 to 8.26 inch.; tail, 3.10—3.50; tarsus, 2.45—2.95; culmen, 2.28—2.70" (Brewster, Auk, IV, 1887, 145-146).

ADDITIONAL NOTES ON A FEW SPECIES.

1. Holbœlls Grebe. Colymbus holbœlli.

Mr. A. G. Baumgartel, of Grand Rapids, informs us that he mounted a specimen for the museum of Hope College, Holland, Mich., which was killed in that vicinity in 1894.

6. Brunnich's Murre. Uria lomvia lomvia.

A specimen was shot near Kalamazoo on Thanksgiving Day, 1907, and mounted by E. H. Crane of that city, who has the specimen.

7. Little Auk. Alle alle.

A Lake Michigan record of this interesting bird is furnished by a specimen killed January 11, 1908, along the ice fringe of Lake Michigan near Port Washington, Wis., and now preserved in the Public Museum of the City of Milwaukee. It appeared to be an adult in ordinary winter plumage (Henry L. Ward, Bull. Wis. Nat. Hist. Soc., VI, April 1908).

15. Ring-billed Gull. Larus delawarensis.

Mr. W. E. Saunders of London, Ont., found this species nesting in large numbers on an island off the Canadian shore of Lake Huron, near the Bruce Peninsula, in June 1905; again, in 1906, he visited another island, about fifty miles southwest of the one just mentioned, and found the Ring-bills nesting there in equal numbers (Wilson Bulletin No. 59, June, 1907, 73-74).

16. Franklin's Gull. Larus franklini.

Mr. A. G. Baumgartel, of Grand Rapids, writes us that he mounted a specimen of this gull for a farmer, who took it on the "Big Marsh," near Holland, on April 28, 1897. He does not know what became of the specimen.

21. Forster's Tern. Sterna forsteri.

We are informed by Norman A. Wood that a fine adult male Forster's Tern was taken in Lodi township, Washtenaw county, in April, 1908, and is now in the University Museum at Ann Arbor.

22. Double-crested Cormorant. Phalacrocorax dilophus.

Additional records are: One taken at Oden, Emmet county in May 1888, and now in the collection of William Brewster, Cambridge, Mass.; three specimens taken at St. Clair Flats in April, October and November, 1906; two immature birds shot on Holton Lake, near Jackson, on October 20, 1911, by C. W. Phelps and Dr. Schrivers, of Jackson, and given to the University Museum at Ann Arbor (Norman A. Wood).

28. White Pelican. Pelecanus erythrorhynchos.

A specimen was taken, May 29, 1908, at Strawberry Island, St. Clair Flats, and sent to Borck's shop in Detroit (B. H. Swales).

29. Brown Pelican. Pelecanus fuscus.

Mr. Albert Hirzel, of Forestville, Sanilac county, writes that he mounted a brown pelican which was killed on the lake near that place. The specimen was sent to the Harbor Beach High School, and we have not been able to verify the identification. It is not impossible that it may prove to be an immature White Pelican.

104. Hudsonian Godwit. Limosa hæmastica.

There is a mounted specimen, No. 20309, in the Kent Scientific Museum, marked "Grand Rapids," but without other data.

149. Barn Owl. Aluco pratincola.

A specimen was taken at Lansing in October 1869, and was for a time in the Agricultural College collection (Cat. No. 602), but was exchanged or lost track of. It was collected by James Satterlee. Mr. Samuel Spicer, of Goodrich, Genesee county has a mounted specimen which he collected near that place about 1897.

214. Greater Redpoll. Acanthis linaria rostrata.

A specimen was taken by W. H. Grant, at Houghton, Mich., November 20, 1904, and is now in the University Museum at Ann Arbor (No. 32262). The determination was verified by Norman A. Wood and the writer.

APPENDIX 2.

HYPOTHETICAL LIST.

This list includes species which have been attributed to Michigan but whose status, for one reason or another, is doubtful.

Western Grebe. Æchmophorus occidentalis (*Lawr.*). (1)

A western species, breeding from British Columbia to northern California, and from Saskatchewan to North Dakota, and straggling eastward accidentally as far as Minnesota and Wisconsin. In spite of numerous references to this species we have failed to find a single good record for Michigan. Holbœlls Grebe seems to have been mistaken for this species quite generally, but with little excuse. The fact that the neck of the Western Grebe is nearly or quite as long as the body, and the culmen always more than 2½ inches long separates it sharply from any other grebe.

Eared Grebe. Colymbus nigricollis californicus (*Heermann*). (4)

This is another western species which sometimes strays eastward as far as the Mississippi, and casually even farther. It has been reported several times from Michigan, but we have been unable to verify a single instance. There is a genuine specimen in the University of Michigan Museum at Ann Arbor, said to have been taken in the vicinity, but the data are open to so much question that the specimen must be ignored. Mr. Norman A. Wood writes that another specimen was taken at Saline, Washtenaw county, January 10, 1879, by William Minett. We have not been able to verify the determination of this specimen, or even to make sure that it is still in existence. Butler records two specimens for Indiana and there are several others from eastern points. In winter plumage, our common Horned Grebe might be mistaken easily for this species, but the shape of the bill is diagnostic. See key to species of grebes, page 36 of this volume.

Black-throated Loon. Gavia arctica (*Linn.*). (9)

Synonyms: Black-throated Diver; Arctic Loon.

Smaller than the common Loon and larger than the Red-throated Loon, this bird is most likely to be confounded with the latter species. Its tarsus, however, measures less than the middle toe without the claw, while in the Red-throat the tarsus measures more than the middle toe and claw. The winter plumage of the three species is so nearly identical that only a careful comparison of proportions and measurements will separate them satisfactorily.

The present species is a rare winter visitor to the northernmost waters of the United States and probably occurs once in a while on Lakes Superior, Michigan, and Huron. Kneeland includes it in his list of Keweenaw Point birds (1857), and it figures in several of the old lists. Possibly some of these "records" were based on specimens actually taken, but apparently none have been preserved. We have been unable to find a Michigan specimen in any collection, and have been equally unsuccessful in finding an unquestionable record of its occurrence. Until something more definite can be shown it seems best to exclude it from the regular list.

TECHNICAL DESCRIPTION.

"Adult in winter: Above, blackish or slaty without white markings, the throat, foreneck and entire under parts white. Tarsus shorter than middle toe without claw. Distance from base of culmen to anterior point of loral feathers not greater than distance from latter point to anterior extremity of nostril. Length, 26 to 29 inches; wing, 12.15 to 13.20; culmen 2.50 to 2.85; depth of bill at base .75 to .80" (Ridgway).

Puffin. Fratercula arctica arctica (*Linn.*). **(13)**

Included erroneously in some of the older lists, but there seems to be no reason whatever for its retention. It is an arctic or subarctic species common only along the seaboard and never found at any great distance from salt water. It is unsafe to say that its occurrence in Michigan waters is impossible but it is entirely improbable.

Ancient Murrelet. Synthliboramphus antiquus (*Gmel.*). **(21)**

Another bird for whose presence in Michigan lists there is no warrant. A single straggler has been recorded from Wisconsin, and according to Cook, another was reported as taken on the Wisconsin shore of Lake Michigan, but we are unable to verify this statement. Certainly there is no Michigan record, and its capture is about as unlikely as that of the Puffin. Its home is along the shores and islands of the north Pacific.

Black Guillemot. Cepphus grylle (*Linn.*). **(27)**

Practically the same remarks apply to this species as to the preceding, except that so far as we can learn no specimen has ever been taken in any of the territory immediately adjoining Michigan. The "Black Guillemots" recorded by Davidson from St. Clair Flats were Brunnich's Murres (Bull. M. O. C. I, 8, 24).

Murre. Uria troille (*Linn.*). **(30)**

One or more supposed records of this species in all probability rest upon captures of the Thick-billed Murre (Brunnich's Murre), Uria lomvia. There seems to be no good reason why one of these species should occur in some numbers and the other not at all, but such appears to be the fact. There is no valid Michigan record.

Razor-billed Auk. Alca torda *Linn.* **(32)**

Still another member of the family of Auks, Alcidæ, which has been credited to Michigan, but evidently upon insufficient grounds. We know of no capture anywhere in the vicinity of Michigan. It is a sea bird strictly, and as unlikely to occur on the Great Lakes as the Puffin.

Laughing Gull. Larus atricilla *Linn.* (58)

Synonyms: Black-headed Gull.—Larus ridibundus, Wilson.

This is a southern species which is abundant along the South Atlantic coast but is very rarely found in the interior, and there are no satisfactory records for Michigan. Those cited by Cook (Birds of Michigan, 2d ed., 1893, 33) are not supported in any case by specimens, and L. W. Watkins informs us that the report attributed to him is erroneous. Major Boies includes it in his list of the Birds of Neebish Island (1897), but took no specimens.

It is more than probable that some one of the smaller black-headed gulls has been mistaken for it in every case. It should be borne in mind that this bird is about twice the weight of Bonaparte's Gull, and little inferior in measurements to the Ring-billed Gull.

TECHNICAL DESCRIPTION.

Tarsus much longer than middle toe and claw. Adult in summer with the head and mantle dark slate color; five outer primaries entirely black or with small white tips, the rest always white-tipped. Rest of plumage pure white, or rose-tinted in the breeding season. Bill and feet dark red. Length, 15 to 17 inches; wing, 13; tail, 5; culmen, 1.75.

Gull-billed Tern. Gelochelidon nilotica (*Linn.*). (63)

Synonym: Marsh Tern.

A species which has figured frequently in lists of Michigan birds, but without satisfactory evidence. After careful examination of all the so-called records we are convinced that there is not a shadow of excuse for including it in the list. It is a bird of almost world-wide distribution on the salt waters of tropical and warm temperate regions. In the United States it occurs rarely as far north as New England and is extremely rare in the interior. Apparently there is no good record for Ohio, Indiana or Wisconsin, and if it has ever occurred in any part of the Great Lake region its presence must have been entirely accidental. We attribute the frequent reference to this species to the unfortunate name "Marsh Tern" which has led collectors who have found Forster's Tern or the Black Tern nesting in marshes to assume that they had found the Gull-billed Tern. As a matter of fact this bird is twice as heavy as the Black Tern and fully as large as the Common Tern or as Forster's Tern, but as its name implies, the bill is much stouter and thicker than in the genus Sterna, much more closely resembling that of a gull than a tern. Moreover, the bill is entirely black.

Roseate Tern. Sterna dougalli *Montagu.* (72)

A southern species ranging northward along the Atlantic coast to Massachusetts and occasionally to Maine, but apparently confined to the seaboard. There is no authentic record for the state. There is a mounted specimen in the University Museum at Ann Arbor bearing "Mich." on the label, but the record shows that it was obtained from a collector or dealer who did not specify any locality. A skin in the Kent Scientific Museum at Grand Rapids (mentioned in Moseley's list, and referred to by Cook) has no locality label whatever.

TECHNICAL DESCRIPTION.

In this species we have another bird so closely resembling three related species as to be readily confounded with them by any except the most careful observers. It may be known in summer from any Michigan tern by the combination of three peculiarities: The breast and belly are either pure white or rose-tinted; the entire tail is white, the outer and inner webs of the outer tail-feathers being precisely alike; the bill is mainly black, being reddish only at or near the base. The tail is about as long as in the Arctic Tern, being at least an inch longer than in Forster's, and nearly two inches longer than in the Common Tern. Winter adults and young of the year are similar to those of the species already mentioned and can be separated only by the expert. Length, 14 to 17 inches; wing, 9.25 to 9.75; tail, 7.25 to 7.75 (forked for 3.50 to 4.50 inches); culmen, 1.50.

Sooty Tern. Sterna fuscata (*Linn.*) **(75)**

This is another tropical or sub-tropical species of wide distribution which has been credited to Michigan. Its normal habitat in America is from Chili to western Mexico and the Carolinas, casually to New England. It is barely possible that one might be caught in a tropical hurricane and swept northward into the Great Lake region, but we know of no instance. The record for DeWitt, Ingham county (Cook, Birds of Michigan, 2d ed., 1893, 35) unquestionably relates to the Black Tern, which occurs not infrequently on the ponds and marshes of Ingham county, but probably was unknown to the recorder, Dr. Topping, who found the name "Sooty Tern" appropriate to the specimen he took. The Sooty Tern is larger than either the Common Tern or Forster's Tern, mainly sooty black above, but pure white below, the outer pair of tail feathers mainly white, the others blackish.

Anhinga. Anhinga anhinga (*Linn.*). **(118)**

Synonyms: Snake Bird, Water Turkey.

This is a tropical form restricted to the southern portions of the United States and not likely ever to occur within our limits. Its appearance in former lists seems to be due to the statement that Mr. Chas. Dury of Cincinnati, Ohio, had a specimen in his collection which was brought from Sault Ste. Marie, Mich., by a gentleman who is said to have obtained it from the person who shot it, the implication being that it was killed at Sault Ste. Marie. It is extremely improbable that this was the case, there being only the barest possibility that a bird of this kind, accustomed only to tropical waters, could have survived more than a few hours in the icy current of St. Mary's River, even had it in some mysterious manner reached that northern point. It is far more probable that this was a Florida specimen included among the wares of some curio dealer who was willing to ascribe any locality to the bird which would secure its sale. So far as we can learn there is no record of the occurrence of this species north of South Carolina and the southernmost point of Illinois.

Cormorant. Phalacrocorax carbo (*Linn.*). **(119)**

Another species which has appeared pretty regularly in previous lists of the birds of the state, but apparently without warrant. It is practically certain that all the so-called records of this bird are based in reality on the Double-crested Cormorant, *Phalacrocorax auritus* which is doubtless the only species which occurs in Michigan. The Common Cormorant is restricted very closely to the coasts of the north Atlantic and has rarely or never been taken at any distance inland. To the average observer the two species look precisely alike, but there are numerous points of difference, the simplest being the number of tail-feathers, *carbo* having fourteen and *auritus* but twelve.

Harlequin Duck. Histrionicus histrionicus (*Linn.*). (155)

Synonyms: Painted Duck, Mountain Duck, Rock Duck.

The male, readily known by the remarkable pattern of coloration, which has given it the name Harlequin, is slaty blue, black, and mahogany-red, with spots, rings and patches of pure white.

We know of no specimen of this duck taken within the limits of the state. Covert in his manuscript list of 1894-95 states that a specimen was taken at Tawas Bay (Lake Huron), in January 1893 by John Symes; we have been unable, however, to verify this statement. Dr. Gibbs states that a specimen was shot on Lake Michigan near Chicago, and is now in the collection of the Chicago Academy of science. Kumlien & Hollister say "Rare winter straggler to Lake Michigan. Dr. Hoy obtained at least four specimens at Racine, and there is an old record, specimen not extant however, for Milwaukee" (Birds of Wisconsin, p. 25). The bird is fairly common and perfectly well known along the coast of Maine and New Brunswick, and also occurs in numbers in parts of the Hudson Bay region and in the high lakes of the northern Rocky Mountains and the Sierra Nevadas. The Harlequin loves cold weather and ice, and if it occurs at all within our limits it would be only during the winter season and in very small numbers. In the Fur Countries it is said by Sir John Richardson to frequent the eddies below waterfalls and similar localities in rapid streams.

Labrador Duck. Camptorhynchus labradorius (*Gmel.*). (156)

Distribution.—Formerly northern Atlantic Coast, from New Jersey (in winter) northward, breeding from Labrador northward. Now extinct.

The claim of this duck to a place in the Michigan fauna rests mainly if not entirely on the statement of Mr. A. B. Covert of Ann Arbor, who, in company with Mr. Joshua Jones of the same place, took a specimen which Mr. Covert believes was a Labrador Duck, near Delhi Mills, Washtenaw county, Michigan, April 17, 1872. No other naturalist appears to have examined this specimen, which was mounted and in Mr. Jones' collection for many years. Subsequently Mr. Jones died, his collection was scattered, and the specimen has never been located. The bird was a young bird and may easily have been something else than the Labrador Duck. Reference to this specimen is made in Forest and Stream of May 4, 1876. Stockwell in his list of Michigan birds (F. & S. VIII, 23, 380) says "An accidental visitor to Michigan; one or two specimens have been seen in Georgian Bay." Other writers fail to mention the species, and while it is possible it does not seem probable that the bird was ever found in numbers on the Great Lakes. No doubt whatever exists that it is entirely extinct at the present time. The last specimen seen alive was a female shot by Mr. Cheney near the Island of Grand Menan, N. B. (near Eastport, Me.) in April 1871.

TECHNICAL DESCRIPTION.

Adult male: "Head, neck, chest, scapulars, and wings (except quills) white; rest of plumage, including stripe on top of head and broad ring around neck, deep black; stiffened feathers of cheeks brownish white. Adult female: Uniform brownish gray, the wings more plumbeous; tertials silvery gray, edged with blackish; secondaries white, primaries dusky. Young male: Similar to adult female, but chin and throat white, and white chest of adult male strongly indicated; greater wing-coverts white. Length 18 to 23.73, wing 8.50 to 8.90, culmen 1.60 to 1.70 inches" (Ridgway).

Greater Snow Goose. Chen hyperboreus nivalis (*Forst.*). (169a)

Similar to the Lesser Snow Goose, but averaging decidedly larger.

If this bird occurs at all in Michigan it must be merely as a straggler. While it is stated that the range during winter is from the Atlantic coast to the Mississippi Valley, we have no unquestionable record for Michigan, or in fact for neighboring parts of the Great Lake region. It is believed to nest in the far north, east of the Mackenzie Basin, but its nest and egg appear to be unknown, and the nesting grounds as stated above seem to be rather an inference than a known fact.

There seem to be slight differences in shape of the bill in the two forms, but they are most readily discriminated by their measurements, the present form being decidedly larger than the Lesser Snow Goose.

White-cheeked Goose. Branta canadensis occidentalis (*Baird*). (172b)

This is a variety or geographical race of the Canada Goose, belonging properly on the Pacific coast from Sitka to California, and its presence in Michigan is extremely inprobable. It rests solely on the statement of the late W. H. Collins of Detroit, that he had seen specimens which were taken at St. Clair Flats. He was very likely mistaken, at all events there are no specimens or other evidence to confirm his statement.

Cackling Goose. Branta canadensis minima *Ridgw.* (172c)

This is another northwestern coast subspecies whose breeding ground is in Alaska, but which during migration sometimes straggles into the Mississippi Valley. Like the preceding its place in the Michigan list rests only on the word of the late W. H. Collins, who was probably mistaken in his identification. According to Dr. Gibbs, and some other writers, the name Cackling Goose is commonly used for the Snow Goose, and it is not impossible that Collins merely intended to record the capture of the Snow Goose under this name.

Black Brant. Branta nigricans (*Lawrence*). (174)

Similar to the common Eastern Brant, (*B. b. glaucogastra*) but has white streaks or flecks on the *front* as well as sides of neck, forming a white collar in the adult; also much darker below than the Eastern form.

This is a bird of the western shore of the continent, breeding in Alaska and western Arctic America and ranging south in winter along the entire California coast. Its presence anywhere east of the Rocky Mountains is entirely accidental, and it is extremely unlikely that it ever has been seen in Michigan.

The occasional references to Black Brant by contributors to sporting magazines are based usually on the young of the Snow Goose and the Blue-winged Goose, which are very dark compared with the adult Snow Geese. The latter are commonly called "White Brant" in the Great Lake region.

Louisiana Heron. Hydranassa tricolor ruficollis (*Gosse*). (199)

Distribution.—Gulf States, Mexico (both coasts), Central America, and West Indies; casually northward to New Jersey and Indiana.

This species was included in Cook's "Birds of Michigan" probably on the strength of Moseley's statement that there was a specimen in the collection of the Kent Scientific Institute at Grand Rapids. "This specimen bore no locality label and probably was secured by Gunn in the South." (R. H. Wolcott, Dec. 1904). Apparently this specimen has been lost or destroyed, as the writer has been unable to find it in the Kent collection.

Yellow-crowned Night Heron. Nyctanassa violacea (*Linn.*). (203)

The adult is similar in size and proportions to the Black-crowned Night Heron, but the culmen is shorter than the tarsus, the crown is white or yellowish white, often stained with rusty, the rest of the head and throat black, and most of the remaining plumage bluish-gray. The young of the two species are very much alike and careful examination and comparison are necessary in order to separate them; the relative length of culmen and tarsus is the most certain test.

This is a southern bird which would not be expected to occur in Michigan even as a straggler. The only excuse for noting it here is the statement in Cook's "Birds of Michigan" (2d edition, 1893, p. 52) that "a specimen was taken by a taxidermist at Forestville, Sanilac county, and is now in his collection (W. A. Oldfield)". We have not been able to verify this record and feel sure it is a mistake. Mr. Albert Hirzel, a well-known taxidermist and collector of Forestville, has no knowledge of such a capture, but has mounted several Black-crowned Night Herons. There is, however, an immature specimen of the Yellow-crowned Night Heron in the Provincial Museum of Toronto, taken close to that city August 15, 1898 (Auk XXIII, 1906, 220).

Little Brown Crane. Grus canadensis (*Linn.*). (205)

Similar to the Sandhill Crane, but decidedly smaller, its length only about 35 inches and wing 17.50 to 20 inches; while the Sandhill Crane is 40 to 48 inches in length and the wing from 21 inches upward. The bill of the latter always exceeds 5 inches, while that of the Little Brown Crane never reaches 4.50 and averages hardly more than 3.50 inches.

This is a bird of the far north and northwest and it is extremely doubtful if it ever occurs within our limits. No Michigan specimen exists in any collection so far as we can learn, and the few reported occurrences in all probability relate to the common Sandhill Crane.

Clapper Rail. Rallus crepitans crepitans *Gmel.* (211)

Synonym: Salt Water Marsh Hen.

Similar in size and general pattern of coloration to the King Rail, and the young of the two species resemble each other somewhat closely.

Although the name has appeared in various lists, particularly those of Covert, Hughes, Atkins, and Stockwell, we are satisfied that specimens of the King Rail were mistaken for the other species. The Clapper Rail is a bird of the salt marshes of the Atlantic coast and probably never occurs within our limits.

Black Rail. Creciscus jamaicensis (*Gmel.*). (216)

Synonyms: Little Black Rail.—Rallus jamaicensis, Gm.—Porzana jamaicensis of most authors.

A tiny rail whose dark slate plumage, flecked with white, is distinctive.

Distribution.—Temperate North America, north to Massachusetts, northern Illinois, and Oregon; south to the West Indies and Guatemala.

This diminutive rail, the smallest of the genus found in the United States, if not anywhere, is extremely rare in Michigan if it occur at all. So far as we are aware no Michigan specimen exists in any museum or private collection, and it has been recorded from the state but once, and the identification in that case was hardly conclusive. In his list of the birds of Washtenaw county (1881), Mr. Covert says "One specimen only has fallen under my notice from this county; this specimen was brought to me June 4, 1880." In his manuscript list for 1894-95 he states that this bird was killed near Ann Arbor by C. Stoll, and was brought to him on the morning of June 4 just as he was starting for Albion where he was employed. He took the bird with him in his hand-bag, but had no opportunity to skin it until night, when he found that it had spoiled from the heat, and it was thrown away.

So far as we can find, this species is not mentioned in any other Michigan list, but there are records from southern Ontario, northern Illinois, Ohio, Indiana, Wisconsin, Minnesota and Nebraska (See J. A. Allen, Auk, XVII, 5). The single Wisconsin record is as follows: "August 20, 1877 a Marsh Hawk was killed by F. Kumlien from a muskrat house on the border of Lake Koshkonong. When noted first it was eating something, and this proved to be a Little Black Rail" (Kumlien and Hollister, Birds of Wisconsin, p. 39). There are two records for Ohio, and Mr. E. W. Nelson found the species nesting near Chicago in 1875. He states that "The nest was found June 19, 1875, and contained ten fresh eggs. The eggs are creamy white, nearly perfectly oval, thinly sprinkled with fine reddish-brown dots which become larger and more numerous at one end. They average 1 by .85 inches" (Bull. Nutt. Orn. Club, I, 43). Mr. Nelson considers the species a regular summer resident in northeastern Illinois, and not very rare.

This bird is almost mouse-like in its habit of running through the thick grass making it practically impossible to flush it except with a dog. Considering all the facts, it is not improbable that the Black Rail visits southern Michigan occasionally in very small numbers, but thus far has escaped detection.

TECHNICAL DESCRIPTION.

"Dusky above, the back speckled with white. Adult: Head, neck, and lower parts plain dark plumbeous, or slate color, darker (sometimes nearly black) on top of head; belly and under tail-coverts brownish black, barred with white; hind neck and back dark chestnut brown, marked with small dots and irregular bars of white. Young: Similar to adult, but breast, etc. dull grayish, the throat whitish, and top of head tinged with reddish-brown. Downy young: Entirely bluish-black. Length 5 to 6 inches; wing 2.50 to 3.20; culmen .50 to .60; tarsus .85 to .90" (Ridgway).

European Woodcock. Scolopax rusticola *Linn.* (227)

Similar to the common Woodcock, but decidedly larger and with the under parts conspicuously barred with dark brown.

A bird of the Old World, occurring only by accident in eastern North America.

According to A. B. Covert, a single specimen was taken at Ann Arbor, Mich., May 9, 1870, by Dr. William E. Lewitt (Forest and Stream, VI, 402). We have been unable to verify this record, and the specimen has been lost sight of. There are several unquestionable records for the eastern states, and it is supposed that these were wanderers which had reached Greenland, and instead of returning south by way of Europe had crossed to Labrador and moved southward with the hosts of American waders on their autumnal migration.

Western Red-breasted Snipe. Macrorhamphus griseus scolopaceus (*Say*). (232)

Synonyms: Long-billed Dowitcher, Western Brown-back, Gray-back.

Similar in all but size to the Red-breasted Snipe, but decidedly larger. Summer adults may be separated by color of plumage, but in winter dress, in which alone they may be seen in Michigan, they are almost identical.

Distribution.—Western North America, breeding in Alaska to the Arctic Coast, migrating south in winter through the western United States (including the Mississippi Valley) to Mexico, and, less commonly, along the Atlantic Coast.

We have no satisfactory record of this species in Michigan, but its resemblance to the preceding species is so close, and so few of either form are taken, that it is not at all unlikely that stragglers may occur. Mr. B. H. Swales took a specimen near Detroit, August 26, 1905, which was referred to Ridgway and identified somewhat doubtfully as belonging to this western form. Mr. Ridgway remarked that "identification in this plumage is very difficult." As already noted, both forms occur in northern Illinois and both have been taken in Wisconsin, although apparently not in any numbers. Kumlien and Hollister say of this species "They are known only during migrations and then sparingly. A few appear in May and June, and a very few at that, and again in August and September, but so irregularly that they may pass as rare. We have here a good illustration of what continual spring shooting can accomplish" (Birds of Wisconsin, 1903, p. 43).

In habits this species is the counterpart of the Red-breasted Snipe. Its nest and eggs are also similar, but the latter are decidedly larger, averaging 1.74 by 1.21 inches.

Purple Sandpiper. Arquatella maritima maritima (*Brunn.*). (235)

Synonyms: Rock Snipe, Winter Snipe.

The general dark color, with ashy breast and entire absence of streaks, spots, or bars, serve to separate this species sharply from any other of similar size. For proportions and other characteristics consult the artificial key on pages 171, 172 of this volume.

Distribution.—Northern portions of Northern Hemisphere; in North America chiefly the northeastern portions; breeding in the high north, migrating in winter to the Eastern and Middle States, the Great Lakes, and the shores of the larger streams in the upper Mississippi Valley.

This bird is partial to rocky shores and cold weather; a late migrant and likely to remain on the lake shore until ice forms. While we have no actual records for the state, it seems almost certain that the species must occur in suitable places, at least occasionally. E. W. Nelson found it on the shore of Lake Michigan in northeastern Illinois (Bull. Nutt. Orn. Club, II, 1877, 68). One was obtained near Chicago, on the lake shore, November 7, 1871 (Baird, Brewer and Ridgway, Water Birds I, 218). "Dr. Hoy states, in his list of 1852, that this species was abundant at Racine from April 15 to May 20" (Kumlien and Hollister, Birds of Wisconsin, 1903, p. 45). There are also several records for Ontario (McIlwraith, Birds of Ontario, 1894, 138).

Length 8 to 9.50 inches; wing 4.85 to 5.40; culmen 1.10 to 1.45; tarsus .90 to 1.

Curlew Sandpiper. Erolia ferruginea (*Brunn.*). (244)

Scarcely distinguishable from the Red-backed Sandpiper except by the expert, but averaging a little larger, with the bill proportionally shorter, but of the same shape.

Distribution.—The Old World in general; occasional in eastern North America and Alaska.

This is an extremely rare bird anywhere in America, and its presence in Michigan can be regarded only as accidental. There is said to be a specimen in the Museum of the University of Michigan labeled "Michigan," but there is no evidence of its origin upon the books. Dr. Gibbs states that D. D. Hughes records it as taken in 1870 (Manuscript Ornithology of Mich.). According to Dr. R. H. Wolcott there should be a specimen in the collection of the Kent Scientific Institute at Grand Rapids labeled "Detroit, 1869," but the writer found no specimen whatever of the Curlew Sandpiper in the Kent Scientific Museum, after a careful examination in November, 1905. It is not improbable that all these records are based on immature examples of the Red-backed Sandpiper.

Western Semipalmated Sandpiper. Ereunetes mauri *Cabanis.* (247)

Synonyms: Peep, Western Sandpiper.—Ereunetes occidentalis, Lawr.

In plumage so like the ordinary Semipalmated Sandpiper as to be separable only by the expert; but the bill of the western bird averages decidedly longer, measuring .88 of an inch in the male and 1.05 in the female, so that if specimens are carefully sexed there should be no trouble in separating them.

Distribution.—Chiefly western United States, frequent eastward to the Atlantic coast; breeding far north and migrating in winter to Central and South America.

So far as we can find, this species, or subspecies, has not been recorded from Michigan; but, since it occurs in some numbers to the eastward, and has been taken regularly on Lake Koskkonong, Wisconsin (Kumlien and Hollister, Birds of Wisconsin 1903, 48), there is some probability that it might be found in Michigan during migration if carefully sought.

Ruff. Machetes pugnax (*Linn.*). **(260)**

Synonyms: Reeve (for the female).—Tringa pugnax, Linn., 1758.—Pavoncella pugnax of some authors.

In breeding plumage the male is unmistakable from the extraordinary development of the feathers of the neck, which form a collar or ruff which has given the bird its name. The male at other seasons, and the female and young at all times, lack this ruff and would be recognized only by the expert.

Distribution.—Northern parts of the Old World, straying occasionally to eastern North America.

The only record for this species in Michigan, so far as we know, is the statement of G. A. Stockwell which reads: "Two specimens taken by myself, and have heard of three or four others, all taken in Sanilac county, Michigan" (Forest and Stream, VIII, 22, 361). In view of the fact that no specimens have been preserved, and that this writer included several species erroneously, it seems best not to give the Ruff a place in the Michigan list until some new record is forthcoming. Of course there is no question as to the possibility of its occurrence, since it has been taken often enough in the Eastern United States to show that it probably comes south from Greenland with some frequency in company with other shore birds on their fall migration. McIlwraith records the capture of a specimen near Toronto, Ontario, in the spring of 1882 (Birds of Ontario, 1894, 154).

The Ruff is of about the same size as the Bartramian Sandpiper, and resembles that bird more nearly than any other of our shore birds.

Rock Ptarmigan. Lagopus rupestris rupestris (*Gmel.*). **(302)**

It is not likely that this bird ever enters Michigan, but McIlwraith says: "This is another northern species reported by Mr. Bampton as being occasionally exposed in the winter time in the market at Sault Ste. Marie (Canada). It resembles the preceding in general appearance, but is rather less in size, and in winter plumage the black band through the eye of the male serves at once to decide its identity" (Birds of Ontario, 1894, 177-178).

Ground Dove. Chæmepelia passerina terrestris (*Chapm.*). **(320)**

The only record for the state is that published by Dr. H. A. Atkins of Locke, who stated, in July 1884, that *in 1843*, he met with a pair of these birds in the township of Brighton, Livingston county, Michigan (O. & O. Vol. IX, p. 81). Doubtless the good Doctor was mistaken, for, although perfectly honest and fairly reliable, a record first published forty-one years after the observation is certainly open to some question. The normal habitat of this species is in the South Atlantic and Gulf States, and it is extremely probable that the birds which Dr. Atkins saw were merely short-tailed young Mourning Doves.

Black Vulture. Catharista urubu (*Vieill.*). **(326)**

Black Vultures have been reported from time to time by correspondents in different parts of the state and the name occurs in several of the lists. There is little reason, however, to suppose that this species has even been taken within our limits. The Turkey Buzzard looks perfectly black under ordinary circumstances and doubtless is the species which has given rise to the reports mentioned. The Black Vulture is more southern in its distribution and is much less common in most parts of the south. Of course it is by no means impossible that wanderers may occur in Michigan, but we have yet to learn of a record. The specimen reported, as shot near Goodrich, Genesee county by Dr. Green, October 10, 1888, and preserved in Mr. Spicer's collection, proves on examination to be a Turkey Buzzard.

European Buzzard. Buteo buteo (*Linn.*). **(336)**

A native of Europe and western Asia which closely resembles several of our buzzard hawks, especially Swainson's Hawk and the Red-tailed Hawk in certain plumages. It occurs in Kneeland's list of the birds of Keweenaw Point, Lake Superior, under the name of *Buteo vulgaris*, Bechst., but probably was based on Swainson's Hawk, which Kneeland did not record and which he probably mistook for the European Buzzard. There are several other records, especially one of a specimen said to have been taken at Paw Paw, Van Buren county, Michigan, about October 1, 1873, by J. D. Allen; identified by Ridgway, and now in the National Museum. The species was included by Coues in the 5th edition of his "Key," 1903, also in Ridgway's Manual and in the A. O. U. Check-list (2d ed., 1905), number 336, all largely on the strength of this single specimen.

More or less doubt has always attached to the Michigan specimen above cited; not as to the specimen itself, which was correctly identified, but as to its origin in Michigan. It is now believed that through an unintentional interchange of specimens a European skin was included with others collected in America and that there is no actual record of the European Buzzard for this country. Hence it is omitted entirely from the latest edition (1910) of the A. O. U. Check-list.

Western Red-tail. Buteo borealis calurus *Cass.* **(337b)**

Very similar to the common Red-tail, but decidedly darker, some specimens almost black everywhere except on the tail. The tail is like that of the ordinary Red-tail, but always with a black subterminal band and sometimes with several narrower dark bands.

Distribution. –Western North America, from the Rocky Mountains to the Pacific, south into Mexico; casually east to Illinois.

It is supposable that the Western Red-tail should occur accidentally in Michigan, but we do not know of a Michigan specimen in any collection. The late Dr. J. W. Velie, of St. Joseph, told the writer that while at Petoskey, Emmet county, in September 1893, he saw a perfectly black Red-tailed Hawk at very close range. He was riding on an open car at the time and the bird was frightened by the engine and flew up and alighted on a branch close to the track and sat there with wings spread and mouth wide open while the train passed. Dr. Velie was so close that he "could see every feather on the bird" and is positive that it was a black Buteo. This is a good example of a questionable record. The observer probably was as well qualified to identify the bird in question as anyone could be, and the view of the bird left little to be desired.* Nevertheless it may have been *Buteo borealis harlani*, and there is even a possibility that it was a Rough-legged Hawk (*Archibuteo*). Only the capture of the specimen would settle absolutely these points and while the question is open we must relegate the species to the hypothetical list.

In general habits the Western Red-tail does not differ noticeably from its eastern relative, but in the more or less treeless regions of the west the nest is sometimes built in smaller trees and much nearer the ground than is usual in the east, occasionally even on a cactus or the shelf of a cliff.

Harlan's Hawk. Buteo borealis harlani (*Aud.*). (337d)

Synonyms: Harlan's Hen Hawk, Black Hawk, Black Warrior.

Similar to the Western Red-tail, and often equally black; in fact some specimens show little other color, although commonly the tail of the adult is mottled and barred with black, gray, and rusty.

Distribution.—Gulf States and lower Mississippi Valley, north casually to Pennsylvania, Iowa, and Kansas; south to Central America.

We have no record of this hawk for Michigan unless the specimen seen by Dr. Velie at Petoskey, and described under the last number, should be one. There are several records, however, for Indiana and Illinois and it is possible that wanderers may sometimes reach southern Michigan. As noted by Mr. Amos Butler in his Birds of Indiana this is the bird for which in all probability the well known Indian chief "Black Hawk" was named.

Gyrfalcon. Falco rusticolus gyrfalco *Linn.* (354a)

Synonyms: Gerfalcon, Brown Gyrfalcon, Jerfalcon.

The peculiar notched bill characterizes the falcons, and the large species (Peregrine and Gyrfalcon) have only the first primary emarginate on the inner web. The wing of the male Gyrfalcon measures about 14 inches, that of the female 15 to 16 inches.

Distribution.—Northern Europe, Greenland and Arctic America, from northern Labrador and Hudson Bay to Alaska; rarely south in winter to New England.

At least four subspecies of gyrfalcon are found occasionally (usually in winter) along the northern border of the United States, but they are so seldom taken, and the distinctions between them are so slight, that the notes on Michigan occurrences are inextricably confused. We do not know of a single Michigan specimen in any collection. Under the name "Greenland Gyrfalcon, *Falco sacer candicans*" Stockwell says "A single specimen taken in Michigan, on the authority of the late Dr. G. B. Wilson" (Forest and Stream, VIII, 224).

Kneeland wrote: "I have heard of a white falcon of large size (measuring about five feet in the spread of his wings) which was shot on the point; this, I think, must have been the gyrfalcon" (Birds of Keweenaw Point, Lake Superior, Proc. Bost. Soc. Nat. Hist. VI, 1857, p. 232.)

All the Gyrfalcons are birds of the far north, most of them nesting within the Arctic Circle and feeding on ptarmigan, waterfowl, and hares, and only appearing within the limits of the United States in winter.

Richardson's Hawk. Falco columbarius richardsoni *Ridgw.* (357b)

Synonyms: Richardson's Merlin, Richardson's Falcon.

Known by its general resemblance to the Pigeon Hawk, and like that species having the two outer primaries emarginate on their inner webs;

the middle tail-feathers, however, are crossed by five darker and six lighter bands, and it averages slightly larger than the Pigeon Hawk and lighter above.

This is a bird of the western plains of North America from Texas to the Saskatchewan and from the Mississippi to the Pacific, but it seems to be nowhere very common and has been recorded but rarely east of the Mississippi River. It has been included in several Michigan lists, but there is much doubt as to its actual occurrence within our limits. It was originally included in the manuscript list of the Rev. Chas. Fox, and Mr. Covert says that a specimen was taken at Ann Arbor in the fall of 1859, by Dr. Sager, but no such specimen can be found, and it seems likely that the identification was incorrect.

Carolina Paroquet. Conuropsis carolinensis (*Linn.*). (382)

Synonyms: Parrakeet, Carolina Parrakeet, Carolina Parrot, Illinois Parrot, Orange-headed Parrot.—Psittacus carolinensis, Linn., 1758, Wils., Aud.—Conurus carolinensis, Kuhl., 1830, and most recent authors.

The general bright green color, with orange forehead, bright yellow head and neck, and blue-tipped wings, readily distinguish this bird.

Distribution.—Formerly Florida and the Gulf States north to Maryland the Great Lakes, Iowa and Nebraska, west to Colorado, Indian Territory and Texas, and straggling northeastward to Pennsylvania and New York. Now restricted to Florida, Arkansas and Indian Territory, where it is of only local occurrence.

This interesting bird, the only representative of the family found in the United States, has been long extinct in Michigan if indeed it ever occurred here. So far as we can learn no Michigan specimen exists today. Mr. Ridgway, in his "Birds of Illinois" (1889), says "The National Museum possesses a fine adult example from Illinois, another from Michigan and several from the Platte River in Nebraska" (Vol. I, p. 397). The specimen alluded to (No. 1228) is without date or exact locality, and it has been shown recently that it did not come from Michigan, but from the "Southern States" (Swales, Auk, XXVII, 1910, 209). There is a single specimen in the Kumlien collection taken in Waukesha county, Wisconsin in 1844, and probably the only Wisconsin specimen extant (Birds of Wisconsin, p. 73).

It was formerly a regular visitor to Ohio, Indiana and Illinois, and doubtless bred in all those states. Audubon states that they were plentiful in Ohio about 1807, and could be procured as far north as Lake Erie, and Amos Butler, who has collected much interesting matter relating to this species in Indiana, gives a record of their nesting at one time within a few miles of Indianapolis.

Ladder-backed Three-toed Woodpecker. Picoides americanus americanus *Brehm.* (401)

Synonyms: American Black-backed Woodpecker.

Very similar to the Black-backed Three-toed Woodpecker, but somewhat smaller and the middle line of back not uniform black, but more or less crossbarred with white. Length, about 9 inches, wing, 4.40 to 4.60; tail, 3.10 to 3.75; culmen, 1.10 to 1.25.

This species has been repeatedly listed from Michigan, but we are unable to find any record which can be authenticated. It is possible that it may occur in winter, but it seems very improbable that it is a summer resident or even a regular winter visitor in any numbers. In general habits it closely resembles its nearest relative.

Fork-tailed Flycatcher. Muscivora tyrannus (*Linn.*). (442)

Readily recognized by its general resemblance to the common Kingbird, but the tail remarkably long and deeply forked, the outer feathers often 9 or 10 inches in length.

This can be regarded only as an accidental visitor, if indeed it has actually occurred at all in Michigan. At present its claim to a place in our fauna rests on the fact that in June 1882, Dr. Morris Gibbs was shown a specimen of this bird in the collection of A. B. Covert which was said to have been taken at Lake Ridge, Lenawee county, Mich., in July 1879. We have been unable to trace this specimen and are of the opinion that the species has no right to a place in the Michigan list.

Scissor-tailed Flycatcher. Muscivora forficata (*Gmel.*). (443)

There seems to be no record of this species for Michigan.

Traill's Flycatcher. Empidonax trailli trailli (*Aud.*). (466)

Not separable from the Alder Flycatcher, or even from the Acadian, except by an expert.

Distribution.—Western North America from the Mississippi Valley south of latitude 42° to the Pacific, and from the Fur Countries south into Mexico.

It is not impossible that this species may occur during migration in the half dozen southwestern counties of the state, but we do not know of a record of its capture. It is so similar to the Alder Flycatcher, with which it was confounded previous to 1895, that records of specimens seen are entirely valueless. In general habits, nest and eggs, this species seems to be identical with its sub-species *alnorum*.

Fish Crow. Corvus ossifragus *Wils.* (490)

Very similar in appearance to the common Crow, but averaging much smaller, large specimens of the latter being nearly or quite twice as heavy as small Fish Crows, but only an expert can separate large Fish Crows from small specimens of the Common Crow.

Distribution.—Atlantic and Gulf Coasts, from southern Connecticut to Louisiana. Common in the lower Hudson Valley; casual in Massachusetts.

It is extremely improbable that the Fish Crow has any right to a place in our Michigan list. No Michigan specimen exists in any museum so far as can be learned, and apparently all the references but one are based upon the statement of "Archer" (G. A. Stockwell), who says "Frequently seen in the neighborhood of the Great Lakes of Michigan" (Forest and Stream, Vol. VIII, No. 19, p. 300). There is a specimen of genuine *ossifragus* in the University Museum at Ann Arbor bearing the label "Fish Crow. State Geological Survey, Michigan" but since similar labels were placed upon specimens known to have been taken outside the state, it seems altogether probable that this is a southern specimen.

Purple Grackle. Quiscalus quiscula quiscula (*Linn.*). (511)

This is the common Crow Blackbird of the Atlantic states south of Massachusetts and east of the Alleghanies. We have no record of its occurrence in Michigan. It is very similar to the Bronzed Grackle in size, coloration and habits, but typical examples may be readily discriminated by having the feathers of back, rump and belly marked with beautiful iridescent bars which are wanting in the Bronzed Grackle.

Holbœll's Redpoll. Acanthis linaria holbœlli (*Brehm*). (528a)

In color precisely like the Common Redpoll, but larger and with the bill relatively longer.

Distribution.—Extreme northern parts of the continent (also Europe-Asia), especially the islands of the Arctic. South in winter rarely to the northern United States.

No record for Michigan, but said to have been taken in Wisconsin and identified by Dr. A. K. Fisher and Robt. Ridgway (Kumlien and Hollister, Birds of Wisconsin, 1903, p. 93).

Painted Longspur. Calcarius pictus (*Swains*). (537)

Synonyms: Smith's Longspur.

The Painted Longspur in winter plumage is quite similar to the Lapland Longspur, but the male has the entire under parts yellowish brown or buffy, and the throat and fore-breast streaked with dusky. The young and females, however, are separable with difficulty from similar stages of the Lapland Longspur and must be identified by experts.

This species is a northwestern one, ranging from the Arctic Coast to Texas, but rarely passing east of Wisconsin and Illinois during migrations. It is attributed to Michigan by "Archer" (G. A. Stockwell) in his list of Michigan birds (Forest and Stream, VIII, 18, p. 281), but we have no other warrant for its insertion as a bird of our state.

Mr. E. W. Nelson found a flock of about 75 painted Longspurs near Calumet Lake, in northeastern Illinois, in March, 1875, and Amos Butler states that the species is sometimes a common migrant in northwestern Indiana, in the vicinity of Lake Michigan. It has also been recorded from various places in northeastern Illinois, and about Chicago, and there is a record for Greencastle, Ind. Since the bird is a very strong flyer, and an abundant migrant a little farther west, it seems by no means improbable that it occasionally wanders into Michigan, especially into the southwest corner of the state. The Wisconsin records for this species seem to be confined to the southern part of the state, and as Kumlien and Hollister say: "Presumably the migration is from the northwest and they merely cross the southern counties of Wisconsin in the fall, as they are not at all rare on the prairies of Illinois in winter" (Birds of Wisconsin, 1903, p. 95).

TECHNICAL DESCRIPTION.

Wing more than 3.50 inches; all the tail-feathers with inner webs dusky at base, the inner web of the outer feather chiefly white; under wing coverts and axillars wholly pure white; entire lower parts buffy.

Adult male in summer: Top and sides of head deep black, relieved by a broad white stripe behind eye, a narrow white stripe along middle portion of ear-coverts, and a white malar stripe, much widest posteriorly; hind neck and entire lower parts deep ochraceous-buff, the first streaked with dusky; anterior lesser wing-coverts deep black, posterior ones pure white, forming a conspicuous bar, widest above. Adult male in winter: Black of head entirely replaced by streaked brownish, the throat and chest also more or less streaked with dusky; otherwise much as in summer, but middle and greater wing-coverts distinctly tipped with white. Adult female in summer: Much like winter male, but smaller, paler, grayer, without deep black or pure white on lesser wing-coverts; in winter similar but more buffy.

Male: Length 6.40 to 6.50 inches; wing 3.60 to 3.70. Female: Length about 5.50 to 6 inches; wing 3.45 to 3.60 (Ridgway).

Montana Junco. Junco hyemalis montanus *Ridgw.* (567f)

Similar to the common Junco (*hyemalis*), but with the sides more or less pinkish brown. Not to be identified, however, by any but the expert with abundance of material for comparison.

Distribution.—Northern Rocky Mountains. Breeds in Canadian Zone from southern Alberta south to northern Idaho and northwestern Montana; in winter south to Arizona, Texas and northern Mexico. East casually to Kansas, Illinois, Indiana, Massachusetts and Maryland.

In Dr. Miles' list of Michigan birds (1860) the "Oregon Snowbird" was included on the authority of Prof. Fox who, according to Miles, took two at Grosse Isle, Wayne county, Mich. In the autumn of 1878, Dr. H. A. Atkins of Locke, Ingham county, says he shot two Oregon Juncos and saw perhaps twelve or fifteen in all. He says they were first noticed October 11 and last seen October 30. Neither Prof. Fox's specimens nor Dr. Atkins' specimens are to be found now, and so far as can be learned not one of them was ever examined by a critical ornithologist. It is not improbable that they were merely rather unusual specimens of the common Junco (*hyemalis*), yet it is possible that they belonged to one of the forms now recognized as subspecies and variously named, *oregonus*, *annectens*, *shufeldti*, and *montanus*. In the absence of actual specimens it is a waste of time to speculate on the matter. In Ridgway's "Birds of North and Middle America" (Bull. 50 U. S. Narional Museum, Part I, p. 290) the specimens mentioned above by Dr. Atkins are recorded under *Junco montanus*, Ridgw.

Gray-headed Junco. Junco phæonotus caniceps (*Woodh.*). (570b)

November 19, 1878, Dr. H. A. Atkins of Locke, Ingham County, Mich., wrote Dr. J. A. Allen "I took alive October 22, a fine specimen of the Chestnut-backed Snowbird, found in a flock of common Snowbirds." In the Ornithologist and Oologist, Vol. IX, p. 81, July 1884, Dr. Atkins gives the following particulars of this capture: "It was taken alive from weeds in which it had become entangled * * * placed under a sieve in the barn until I could give it better quarters, but while feeding it the next morning it succeeded in getting away from me." It seems altogether probable that this record is based on a mistaken identification. Since it was examined under circumstances which did not admit of careful measurement and comparison with other specimens it is not likely that a correct identification could be made. This species according to Ridgway belongs to the "Rocky Mountain district, breeding from Fort Bridger southward." In his "Birds of North and Middle America" Part I, 1901,

p. 296, Ridgway records this specimen with an interrogation mark, and apparently it is the only record east of the Rocky Mountains.

Black-headed Grosbeak. Zamelodia melanocephala (*Swains*). **(596)**

The main difference between this and the Rose-breasted Grosbeak is that the male has most of the under parts and the rump brownish yellow ("cinnamon ochraceous") instead of rose-pink and white as in our common bird.

This species was included in Dr. Miles' list of Michigan birds (1860) on the authority of Fox, who is said to have taken it at Grosse Isle, Wayne county. On account of this record it was included by Gibbs in his list (1879) and has been frequently mentioned by other writers. It seems perfectly possible that Fox mistook the male Rose-breasted Grosbeak in fall plumage for this western species, whose normal range is from the Pacific coast to middle Kansas, and which otherwise has never been recorded east of South Dakota and Nebraska. This is the more likely from the fact that until very recently (1899) the fact was not generally known that the fall plumage of our male Rose-breasted Grosbeak was entirely unlike its breeding dress.

Blue Grosbeak. Guiraca cærulea cærulea (*Linn.*). **(597)**

A strikingly beautiful bird, the size of a Scarlet Tanager, but the male a rich dark blue with two distinct chestnut wing-bands.

Neither of the two Michigan records is satisfactory. "Archer" (G. A. Stockwell) states that it is a rare visitant to the most southern part of Michigan but gives no instance (Forest and Stream, VIII, p. 281). There is (or was) in the collection of Dr. J. B. Steere, at Ann Arbor, the skin of a male Blue Grosbeak said to have been killed by Albert E. Jenkins, at Ann Arbor, and A. B. Covert on the margin of his copy of Coues Key has noted opposite this species "male, Ann Arbor May 24, 1884." Mr. Covert, however, himself states that there is much doubt about this specimen, and it seems extremely probable that it came from the south. The species is a southern one and has not been recorded in this part of the country north of southern Indiana and southern Illinois, except for several more or less doubtful Wisconsin cases.

Varied Bunting. Passerina versicolor versicolor (*Bonap.*). **(600)**

Synonym.—Western Nonpariel.

A single specimen of this bird was killed at Locke, Ingham county, Mich., May 18, 1874, by Dr. H. A. Atkins and was identified by Robt. Ridgway to whom it was sent at the request of S. F. Baird. It was a male in full plumage (Orn. & Ool. IX, 1884, p. 81).

The normal habitat of this species is given as valley of lower Rio Grande in Texas southward to Guatemala. Its presence in Michigan can hardly be explained except on the ground that it was an escaped cage-bird, yet there seemed to be nothing about the specimen to indicate this strongly. Mr. A. B. Covert, however, who examined the specimen states that he thought it to be such. The specimen was for a time in the collection of J. M. B. Sill in Detroit, and probably afterwards went to the collection of the Detroit Scientific Association, but it cannot now be located. Apparently there is no other record of this species in any of the northern states.

TECHNICAL DESCRIPTION.

Adult male: Forehead, superciliary region, lesser wing-coverts, and rump lavender blue or purplish; crown and occiput wine red, varying to vermilion; back and scapulars maroon-purplish; sides of head and neck, and lower parts, generally plum-purplish, changing to auricula-purple or maroon on the chest, the throat usually more reddish, lores black (Ridgway).

Summer Tanager. Piranga rubra rubra (*Linn.*). (610)

Synonyms: Summer Red-bird; Southern Tanager.

Entirely rose-red, more or less brownish on wings and tail, but no black anywhere. About the size of the Scarlet Tanager, but the bill much larger and the tail nearly an inch longer. The female is olive-green above and yellowish below, but usually with a wash of orange everywhere, giving it a very different appearance from the female Scarlet Tanager.

There are two doubtful records of this species for Michigan. One occurs in Stockwell's list of Michigan birds (Forest and Stream, Vol. VIII, 281), the other in the margin of A. B. Covert's copy of Coues' Key, where there is a note which reads: "Male, Ann Arbor, July 13, 1879." Mr. Covert can give us no further information with regard to this specimen, and we have therefore no absolute record for the state. Several correspondents have assured us positively that they have seen a bird answering this description, but knowing how easily one may mistake a Scarlet Tanager or a Cardinal for this bird, we do not feel warranted in including it on such evidence. It is normally a southern bird, ranging north to southern New Jersey and southern Illinois, casually to Massachusetts, Ontario (two records), and accidentally to Nova Scotia. According to Kumlien and Hollister it is a rare but regular summer visitor in southern Wisconsin, having been reported half a dozen times or more and specimens taken near Janesville, Milton, Johnstown, Racine and Milwaukee.

In general habits, song, nesting and eggs it is very similar to the Scarlet Tanager.

Loggerhead Shrike. Lanius ludovicianus ludovicianus *Linn.* (622)

Synonyms: Loggerhead, Summer Butcher Bird.

Smaller than the Northern Shrike (wing 4 inches or less), and without wavy cross-lines below, or with very faint ones. The lower parts are almost pure white and the tail not shorter than the wings– usually longer.

Distribution.—"Austroriparian Zone of the Atlantic and Gulf States from southern North Carolina to southern Florida and west to Louisiana" (A. O. U. Check-list, 1910).

The notes relating to the Michigan shrikes are badly mixed, owing to the assumption for many years that our commonest shrike was the Loggerhead, but that the western form, the White-rumped Shrike (*L. l. excubitoroides*), was occasionally found here. Recently it has been shown that our commonest shrike in summer is a form intermediate between the White-rumped Shrike and the true Loggerhead and this form has been named the Migrant Shrike. The true or southern Loggerhead may possibly occur, however, in the southern part of the state, but thus far we have been unable to find an actual specimen in any collection. The distinctions between these subspecies are very slight and their recognition unlikely except by the expert. In all essential respects the Loggerhead has the habits and characteristics of the Migrant Shrike and the White-rump.

TECHNICAL DESCRIPTION.

Bill strongly hooked, wing less than 4 inches, tail averaging longer than wing, third and fourth primaries about equal, the fourth usually a little the longest.

Adult (sexes essentially alike): Upper parts slate-gray to ash-gray, very little if at all paler on the rump and upper tail-coverts; nasal bristles, lores, and broad stripe around and behind the eye, clear black, the black continuous across the front of forehead; a faint white or grayish line between this black area and the gray of the top of head; under parts nearly pure white, sometimes faintly shaded with grayish on sides of breast and body or (in immature birds) slightly tinged with reddish; wings black, with a conspicuous white patch near the middle of the primaries, and most of the secondaries and tertiaries tipped with white; scapulars mostly pure white; central tail-feathers black, outer tail-feathers pure white or with a small black area near base, other tail feathers black broadly tipped with white; bill and feet entirely black; iris brown. Young: Similar to adults, but all the gray and white areas strongly washed with brownish; back and under parts with numerous wavy cross-lines of brown or dusky; greater wing-coverts tipped with rusty or buffy.

Length 8.50 to 9.50 inches; wing of male 3.75 to 3.90, of female 3.66 to 3.78; tail of male 3.89 to 4.15, of female 3.87 to 3.97; culmen about .59 (Wm. Palmer).

White-rumped Shrike. Lanius ludovicianus excubitorides *Swains.* (622a)

Separable from the Loggerhead and Migrant Shrike only by the expert, and with difficulty; often not separable at all. The Migrant Shrike is said to have "darker, duller plumage, especially beneath, to be stouter and longer, and to have larger bill, tarsi and feet." (Palmer, Auk, XV, p. 251).

It seems doubtful whether the true White-rumped Shrike, as distinct from the Migrant Shrike, ever occurs in Michigan. For the present at least we may relegate this species to the doubtful list.

Its natural habitat is from the eastern border of the Plains to the Pacific, and from Manitoba and the Plains of the Saskatchewan south over the tablelands of Mexico.

Parula Warbler. Compsothlypis americana americana (*Linn.*). (648)

The typical form of the Parula or Blue Yellow-backed Warbler does not seem to be found in Michigan, being replaced by the northern form, *C. americana usneæ* Specimens intermediate between the two forms occur in northern Indiana according to Butler (Birds of Indiana, 1897, p. 1040), and possibly some of these occur in southern Michigan, but all the specimens we have seen appear to belong to the northern subspecies.

Yellow-throated Warbler. Dendroica dominica dominica (*Linn.*). (663)

Very similar to the Sycamore Warbler (No. 280) which has been mistaken for it several times. The latter is readily discriminated with specimen in hand, since the stripe over the eye is almost or quite pure white, while it is distinctly yellow anteriorly in the Yellow-throated Warbler. The latter is a bird of the Southern Atlantic States, and there is no authentic record of its occurrence in Michigan.

Brown-headed Nuthatch. Sitta pusilla *Lath.* (729)

Smaller than the Red-bellied Nuthatch, with the top and back of head grayish-brown; no white over the eye, but a whitish patch on the nape.

Distribution.—South Atlantic and Gulf States, north to southern Maryland and (casually) Ohio, Missouri, etc.

This bird must be considered as purely accidental in Michigan. The only actual record (and that not free from question) is that published by Dr. H. A. Atkins (Ornithologist and Oologist, Vol. 9, 1884, p. 81), which reads: "Taken May 12, 1875 [at Locke, Ingham county, Mich.] This bird was sent in the flesh to W. H. Collins of Detroit to be mounted, but on account of the warm weather it spoiled before reaching him." This record doubtless forms the basis for Ridgway's statement (Manual of N. Am. Birds, 1887, p. 560). "North regularly to lower Maryland and Virginia, casually to Ohio, Michigan, Missouri, etc."

Without questioning the general accuracy of Dr. Atkins' observations, it may still be said that there is a large amount of individual variation in the Red-bellied Nuthatch, and immature birds, particularly females, often show irregular patches of white here and there about the head, while the typical glossy black cap, with the sharp superciliary white line, is found only in old and full-plumaged males. A slightly abnormal young specimen of *Sitta canadensis* might have been mistaken for *Sitta pusilla* by even so good a naturalist as Dr. Atkins. Nevertheless it must be remembered that several other species which normally are found only in the south have been taken occasionally in northern Indiana and Ohio, southern Michigan, and western Ontario. The recent capture of the Chuck-wills-widow at Point Pelee, Ontario, less than 30 miles southeast of Detroit is a case in point (Fleming, Auk, XXIII, 1906, 343).

TECHNICAL DESCRIPTION.

"Above plain bluish-gray, the top of head (down to eyes and ear-coverts) brown, bordered below by a darker loral and postocular stripe; no superciliary stripe.

"Adult: Nape with a conspicuous white spot; tail-feathers (except middle pair) tipped with white, the subterminal portion black; the middle tail-feathers without distinct basal spot of white. Sexes alike. Young; Top of head grayish, the wing-coverts and tertials edged with light fulvous" (Ridgway).

Length 3.85 to 4.40 inches; wing about 2.60; culmen .50 to .60.

Long-tailed Chickadee. Penthestes atricapillus septentrionalis (*Harris*). (735a)

Synonym: Western Chickadee.

The Long-tailed Chickadee belongs to the Rocky Mountain region of North America, extending eastward nearly across the Plains, but not recorded (officially) east of Iowa and western Minnesota.

According to Ridgway it is similar to the common Chickadee "but larger, with wings and tail averaging decidedly longer; coloration paler, with the whitish edgings of the greater wing-coverts, secondaries and lateral rectrices broader and more conspicuous."

This bird has been recorded for Michigan only by Dr. H. A. Atkins of Locke, Ingham county, who states that he took a specimen at Locke May 29, 1874, and another specimen a little later. He says: "The tail was a trifle less than three inches, the size of the tarsus and foot excessively large for so small a bird" (O. & O., Vol. 19, 1884, p. 81). Apparently the specimens taken by Dr. Atkins were not preserved, and in their absence we do not feel justified in giving this bird a place in our fauna. Kumlien and Hollister include this sub-species in their list of Wisconsin birds, stating that "in late fall and winter typical specimens are taken in

Wisconsin, even in the southern part of the state, but more often in the northwestern portion" (Bull. Wis. Nat. Hist. Soc. III, 1903, 124). No statement is made as to the authority for the identification of these specimens. If this form occurs in Michigan at all we should look for it in the extreme western part of the Upper Peninsula in fall and winter; the fact that Dr. Atkins' specimens were taken in southern Michigan and in late spring increases our doubt as to the identification.

Willow Thrush. Hylocichla fuscescens salicicola *Ridgw.* (756a)

Synonyms: Western Tawny Thrush; Western Wilson's Thrush.

This is the western form of the Veery, differing but slightly from the typical form, but often decidedly larger and with the spots of the breast somewhat darker. It belongs to the Rocky Mountain region, ranging eastward regular to Dakota and more rarely to Illinois, Wisconsin, and probably to Minnesota. Specimens have been taken at Chicago, Ill., Grand Crossing, Ill., Liverpool, Ind. (Butler, Birds of Indiana, p. 1151), and a single specimen was taken at Delevan, Wis., May 6, 1899 and identified by William Brewster (Birds of Wisconsin, 1903, p. 126). Mr. P. A. Taverner of Detroit writes "I believe that Saunders has taken it at London, Ont. and Fleming at Totonto, Ontario. * * * I believe that all specimens taken after September 15 or 20 can usually be referred to this form." We have not had opportunity to examine any suspected specimens, but collectors should be on the lookout for this subspecies.

Greenland Wheatear. Saxicola œnanthe leucorhoa (*Gmel.*). (765a)

This is a bird of striking plumage, and about the size of a common Blue Bird, native to Greenland, adjacent portions of North America, and Iceland, but has been recorded also from Quebec, Ontario, New Brunswick, New York, and once or twice from New England, probably while wandering southward on its autumnal migration.

There are no satisfactory records of the Wheatear in Michigan. "Archer" (G. A. Stockwell) says: "An occasional autumnal visitor to Sanilac and St. Clair counties" (Forest and Stream, Vol. 8, No. 16, p. 241), but cites no specimens. It is not improbable that it may occur at rare intervals, but we have no proof of its presence as yet.

APPENDIX 3.

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296. 32. Game Birds of Michigan, Fish and Game Warden, August to Nov., 1890. 33. The American Cuckoos. Nature's Realm, April, 1891. 34. The Kingfisher, the Angler's Companion. American Angler, July, 1892. 35. A Flight of Hawks. American Field, Oct. 8, 1892. 36. The Night Hawk. Ibid, Oct. 15, 1892. 37. Bird Life in a City Yard. Forest and Stream, Oct. 28, 1892. 38. A Habit of the Robin. Ibid, Oct. 20, 1892. 39. The Bird in its nest. Science, XX, 1892, 99. 40. Acorn Eating Birds. Ibid, 133. 41. The Effects of Civilization on our Birds. Ibid, 183. 42. The Arrangement and Number of Eggs in the Nest. Ibid, XXI, 1893, 148. 43. Singing of Birds. Ibid, 245. 44. The Visitors to One Oak Tree. Ibid, XXII, 225. A list of 64 species of birds observed in one tree in a city. Notes and observations covering a quarter of a century. 45. Birds Which Sing on the Nest. Ibid, 282. A list of 10 Michigan species. 46. Bird Notes. Ibid, 317. 47. Birds Which Nest in Cavities and Burrows. Scientific American, IV, 1893, 8. 48. The Pine Grosbeak in Michigan. Ornithologist and Oologist, XVIII, 1893, 39–41. 49. Malformation in Birds. Ibid, 91. 50. The American Osprey. Oologist, X, 1893, 39. 51. The Herons of Michigan. Ibid, 73. Notes on seven species. 52. Raptores of Michigan. Ibid, 107. 53. The Blossom Eater. Nidiologist, II, 1894, 48. Refers to the Yellow Warbler. 54. The Small Waders of the Great Lakes. American Field, Chicago, Nov. 10, 1894. An annotated list of the so-called "Bay Birds" of the Great Lake system, embracing 36 species of Snipe, Plover, Phalarope, etc., etc. 55. ("Scolopox") Hints for Egg Collectors. Nidiologist, II, 1895, 119-120. 56. The Crows, Jays, and Pies of Mich. Ibid, 136-137. 57. Notes from Mich. Ibid, III, 1895, 49, 65. 58. Notes from the Great Lakes. Ibid, 86-87. 59. Michigan Notes. Ibid, 94. 60. Birds Which Sing on the Wing. Oologist, 1896, 55. A list of 7 species that give regular songs in flight. 61. The Game Birds of the Great Lakes. American Field, Chicago, Dec. 27, 1896, to Feb. 11, 1899. About 58 columns. A series of 59 articles on the Snipe, Plover, Rails, and all other shot as game birds by gunners in the Great Lake Region, embracing 92 species, with notes and observations on many. 62. The White-throated Sparrow. Bull. Mich. Orn. Club, I, 1897, 34-36, 41. Nesting habits and song. 63. Additions to the Avifauna of Kalamazoo County, Mich. Ibid, II, 1898, 7. List of 9 species (all migrants) added to the fauna of the state since his list of 1885. They are: Double Crested Cormorant, Turkey Vulture, Golden Eagle, Yellow Rail, Black-crowned Night Heron, Barn Owl, Swallow-tailed Kite, Kirtland's Warbler, and Orange-crowned Warbler. 64. Bird Songs. Ibid, 25-31. Different ways of writing the songs of common birds. Also notes on birds which sing on the wing; another on night singers, and some which sing from the nest. 65. The Dickcissel in Michigan. Ibid, III, 1899, 6. A compilation of records, old and new. 66. May have been Brunnich's Murre. Ibid, 8. 67. Moulting. American Ornithology, III, 1903, 278. 68. An Addition to the Avifauna of Kalamazoo County. Bull. Mich. Orn. Club, IV, 1903, 27. Black Tern nesting at Long Lake, May 27, 1898. 69. The Grackles Change in Nesting Habit. Ibid, 57-58. 70. Birds vs. Wildflowers. Ibid, V, 1904, 55. 71. Obituary Notice of (by W. B. B.). Auk, XXVI, 1909, 105-106.

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4. The Pine Grosbeak, Pinicola enucleator Cab. Ibid, I, No. 3, 1877. 5. Winter Notes on the Birds of Kent County, Michigan. Ibid, I, 1877. Thirty-six species with annotations. 6. Arrival of Birds at Grand Rapids. Ibid, I, 1877. 7. Nesting Habits of the Shore Lark, Eremophila alpestris Boie. Ibid, I, 1877. 8. Bird in Winter. Ibid, I, 1877. 9. The Canada Goose. Ibid, I, 1877. 10. Items from Michigan. Western Oologist (Wis.), I, No. 5, 1878. 11. Nesting Habits of Warblers. Ibid. Describes the nests and eggs of Black-throated Blue and Golden-winged Warblers. 12. Notes on the Wild Pigeon. Ibid. 13. The Western Logger-head, White-rumped Shrike, Collyrio excubitorides. Naturalist and Fancier, II, 1878. 14. The Evening Grosbeak, Hesperiphona vespertina Bp. Ibid, II. 15. Rare Birds of Michigan. Bull. Nutt. Orn. Club, IV, 186. 16. Woodpeckers of Michigan. Agricultural World (Grand Rapids), IV, 1881. 17. Notes on the Winter Birds of Kent County, Michigan. Ibid. 18. Additional Notes on the Winter Birds of Kent County, Mich. Ibid. 19. Arrivals. Ornithologist and Oologist, VI, 1881. 20. Obituary Notice of. Ornithologist and Oologist, XI, 1886, 73.

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The Sora Rail. Ibid, March 16, 1870. 5. The Different Species of the Plover Family. Ibid, April 3, 1870. 6. The Ruffed Grouse. Ibid, Oct. 7, 1870. 7. Song Birds of Michigan. Ibid, Feb. 12, 1871. 8. The Robin, Bluebird and Catbird. Ibid, Feb. 19, 1871. 9. The Pinnated Grouse or Prairie Chicken, Cupidonia cupido. Ibid, March 24, 1871. 10. The Wild Turkey, Its Origin and Habits. The Moderator, Grand Rapids, IV, 1870, 373. A reprint of article in Free Press for Jan. 24, 1870. 11. Michigan Birds, Their Relation to Agriculture. Report of the Mich. Pomological Society, 1872, 442.

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Kalmbach, Edwin R.—1. Notes on Three Michigan Birds. Auk, XXV, 1908, 230. Prothonotary and Mourning Warblers and Henslow's Sparrow.

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Lockwood, E. A.—1. Snowy Owls and Swans Taken at South Haven. American Field, XXVII, 1891. Ten owls and two swans taken in December.

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Miles, Dr. Manly.—1. Catalog of Birds of Michigan. Geological Surv. of Michigan, 1861, 222-232. Two hundred three species listed.

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Morden, John A.—1. Notes from Isabella County, Mich. Oologist, X, 1893, 24. Notes on Saw-whet Owl, Marsh Hawk, etc. 2. A Collector's Gun. Ibid. X, No. 4, April, 1893.

Moseley, E. L.—1. Notes on Winter Birds of Michigan. Forest and Stream, XXVIII, 1881, 4. Six species are mentioned. 2. Winter Woodpeckers of Michigan. Ibid, XXXII, 1885, 63. 3. List of Michigan Birds in the Museum of the Kent Scientific Institute, Grand Rapids, Michigan. Democrat Company, Grand Rapids, 1887. Embraces 231 species, not all from Mich.

Mulliken, W. E.—1. Nesting of a Chimney Swift in a Freight Car. Ornithologist and Oologist, XVII, 1892, 159. 2. The Rose-breasted Grosbeak in Michigan. Ibid, 152. 3. A few Michigan Notes. Nidiologist, III, 1896, 77. 4. Capture of Song Sparrow, Jan. 19, 1897, at Grand Rapids. Bull. Mich. Orn. Club, I, 1897, 23. 5. Large Numbers of Cowbird's Eggs in Nests of Vireo and Towhee. Ibid, 27. 6. Birds Killed on Electric Light Towers at Grand Rapids. Ibid, 45. Ten species noted. 7. American Goshawk in Kent County. Ibid, II, 1898, 7. 8. Notes on Kent County, Michigan, Birds. Ibid, III, 1899, 8. Among them are Lincoln's Sparrow, Herring Gull, Old-squaw, Pied-bill Grebe. 9. A Peculiar Set of Eggs of the Scarlet Tanager. Ibid, 18.

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Oldfield, W. A.—1. Breeding of Rose-breasted Grosbeak and Red-backed Sandpiper in Sanilac County, Michigan. Ornithologist and Oologist, XVI, 1891, 144.

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Phillips, Frank J.—1. The Dissemination of Junipers by Birds. Forestry Quarterly, VIII, No. 1, pp. 1-16.

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Purdie, H. A.—Another Kirtland's Warbler. Bull. Nutt. Orn. Club, IV, 1879, 185. 2. Record of Additional Specimens of the White-throated Warbler. Ibid, 184-185.

Purdy, Jas. B.—1. The Traill's Flycatcher. The Hawkeye Orn. and Ool., I, 1888, 41-42. 2. Nesting of the Barred Owl and Great Horned Owl at Plymouth, Mich. Ornithologist and Oologist, XIV, 1889, 54. 3. Curious Nesting Traits of Birds. Ibid, 92. 4. Nests that Perished in the Storm. Ibid, 110. 5. Horned or Prairie Horned Lark, Which is it? Ibid, XV, 1890, 138, 139. 6. Late Nesting of the Wood Pewee. Ibid, XVI, 1891, 28. 7. Nesting of the Bobwhite, August 30, 1891. 8. Nesting of the Great Horned Owl. Ibid, XVII, 1892, 57. Nest found March 20, 1892. 9. Domestication of the Canada Goose. Ibid, XVIII, 1893, 4-5. 10. Nesting Habits of Great Horned Owl at Plymouth, Mich. Ibid, 92. 11. Dickcissel at Plymouth, Mich. Nidiologist, III, 1895, 37. 12. Some Unusual Occurrences. Bull. Mich. Orn. Club, II, 1898, 38. Reports Goshawk, Kingfisher, Golden Eagle and Barn Owl. 13. Nesting Place of Maryland Yellowthroat. Ibid, III, 1899, 7. 14. Bonaparte's Gull, and Brown Thrasher at Plymouth. Ibid, 8. 15. A Scarcity of Winter Birds. Ibid, 8. 16. A few Notes on our Winter Birds, 1902-3. Ibid, IV, 1903, 57. 17. The Passenger Pigeon in the Early Days of Michigan. Ibid, 69-71. 18. An Albino Grackle at Plymouth. Ibid, 82.

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Saunders, William.—1. Condemns the Robin, Cherry Bird and English Sparrow. Report of Mich. Horticultural Society, 1883, 164.

Schoolcraft, Henry R.—1. A Supposed New Bird. Historical and Scientific Sketches of Michigan, 1834. The Evening Grosbeak.

Selous, Percy.—1. Occasional Bird Notes in and Around Greenville. Bull Mich. Orn. Club, I, 1897, 13. Notes on Pine Grosbeak, Northern Shrike, and Bittern. 2. The Evening Grosbeak Again. Ibid, 25. Records Evening Grosbeaks and Pine Grosbeaks March 21 and 24, at Greenville, Mich. 3. Greenville Notes. Ibid, 45. Records Pine Siskins at Greenville, May 25th; also capture of Black-bellied Plover, August 16, with notes on other species. 4. Occasional Bird Notes. Ibid, II, 1898, 20. Records White-winged Scoter on the river at Greenville, March 14, 1898, with other notes. 5. The Rapid Disappearance of our Birds of Prey and the Result which must follow. Ibid, 32-33. 6. Greenville Notes. Ibid, 37. Relate to Rough-legged Hawk, Hummingbird, Snow Geese, Carolina Rail, Nighthawk, etc. 7. Long-tailed Duck at Greenville Ibid, 40. One taken January 31. 8. Greenville Notes. Ibid, III, 1899, 7. Mentions Quail, Northern Shrike, Bohemian Waxwing, Old-squaw, Great Blue Heron, Snow Goose, and others.

Shuver, F. S.—1. Van Buren County Notes. Bull. Mich. Orn. Club, II, 1898, 15-17. Valuable notes on the Raven, Cardinal, Wild Turkey, Pileated Woodpecker, and more common birds. 2. Dickcissel in Van Buren County. Ibid, III, 1899, 18. Said to be very common in suitable localities.

Slayton, C. M.—1. Heronry in Kent County. Bull. Mich. Orn. Club, III, 1899, p. 18.

Smith, Frank.—1. An Unusual Flight of Sparrow Hawks in Michigan in 1904. Bull. Mich. Orn. Club, V, 1904, 77-78. At Macatawa, Ottawa Co., August 30, 1904. 2. A Migration Flight of Purple Martins in Michigan in the Summer of 1905. Wilson Bull., XX, 1908, 41-43.

Smith, W. A.—1. The Birds Our Friends. Report Mich. State Horticultural Society, 1885, 249.

Spicer, Samuel. Notes from Goodrich, Genesee County, Michigan. Ornithologist and Oologist, XIV, 1889, 43.

Steere, Dr. J. B.—1. Migration of Birds. Report of State Pomological Society, 1880, 115-124. Seven pages given to migration and habits, followed by lists of birds of the state grouped under five heads, as follows: List A, Birds Resident in Michigan—33 species. List B, Birds nesting in Michigan and Wintering to the South—110 species. List C, Birds Wintering to the South of Michigan and Nesting to the North, being only known in the state as migrants—68 species. List D, Winter Visitors but not Summer Residents in Michigan—18 species. List E—Probably on the Great Lakes in Winter—36 species. The total number of species listed is 265, but several are included erroneously and each list has mistakes, list C in particular being replete with them.

Stockwell, G. A. ("Archer").—1. Game of Michigan, Wild Turkey. Rod and Gun, IX, 1876, 65. 2. The Fauna of Michigan (Birds). Forest and Stream, VIII, 1877, 224, 241, 261, 281, 300, 360, 380. Merely a list of birds attributed to the state, but in most cases without any records or authorities cited.

Stowell, Bert.—1. A Red-winged Blackbird at Drayton Plains during the Winter of 1901-2. Bull. Mich. Orn. Club, IV, 1903, 26. 2. A Twice-used Nest. Ibid, 56. Bluebird eggs in an old robin's nest.

Strang, J. J.—1. Natural History of Beaver Islands, Michigan. Ninth Annual Report Smithsonian Institution (1854), 1855, 282-288. Three lines are given to birds.

Sudworth, George B.—1. Polioptila caerulea (Gnatcatcher). Naturalist and Fancier (Grand Rapids), II, No. 3, 1878.

Swales, Bradshaw H., Jr.—1. Late Nesting of Woodcock. Ornithologist and Oologist, XVI, 1891, 144. 2. Nesting Notes. Ibid, 1890, 148. 3. Notes on Migration. Ibid, 159. 4. Rose-breasted Grosbeak and Long-eared Owl. Ibid, XVII, 1892, 75. 5. Nesting of the Virginia Rail. Ibid, 103. 6. Nest of Phoebe. Ibid, III. 7. Albino Eggs of Long-billed Marsh Wren. Ibid, 121. 8. Field Sparrow in Michigan, Ibid, 159. 9. American Woodcock at Detroit. Ibid, XVIII, 1893, 79. 10. The Least Bittern. Nidiologist, II, 1895, 108. 11. Michigan Notes. Ibid, 139. 12 Wood Thrush. Ibid, III, 1896, 115. 13. Dickcissel Breeding at Detroit. Ibid, III, 1895, 19. 14. A Trip to Grassy Island. Bull. Mich. Orn. Club, I, 1897, 30-32. Notes on a dozen or more species and the nests of the Black Tern, Gallinule, Coot, Least Bittern, Pied-bill Grebe, and several Rails. 15. Bird Notes from Grassy Island. Ibid, III, 1899, 20. Notes on various species, summer and winter. 16. A Few Wayne County, Mich., Notes. Wilson Bull., XIV, 1902, 139. Notes on 14 species. Records capture of White-winged Scoter and Hudsonian Curlew at St. Clair Flats; also 3 specimens of Pigeon Hawk near Detroit. 17. A list of the Land Birds of Southeastern Michigan. Ibid, IV, 1903, 14-17, 35-40; Ibid, V, 1904, 37-43. 18. Notes on the Winter Birds of Wayne County, Mich. Wilson Bull,. XV, 1903, 20-24. Notes on 61 species. A Rusty Blackbird killed by J. C. Wood, Jan. 25, 1891. Several Cowbirds in Detroit in Jan., 1890. Rough-leg called "Old Feather Boots." 19. Additions to Winter Birds of Wayne County, Mich. Ibid, XVI, 1904, 82-83. Larus marinus shot on Detroit River in March, 1904. 20. Breeding of the Broad-winged Hawk in Wayne County. Bull. Mich. Orn. Club, V, 1904, 69. Nest and 3 eggs, with parent bird, taken April 29, 1903. 21. Evening Grosbeak in Presque Isle Co., Mich. Auk, XXI, 1904, 82. 22. A Few Southern Mich. Notes. Ibid, 84-85. Notes on 8 species, including Phila. Vireo, Saw-whet Owl and Caspian Tern. The Phila. Vireo taken in St. Clair Co., August 28, 1896. 23. White-winged Crossbill. A Correction. Ibid, 281. Not breeding in Genesee county, Mich., as reported in Cook's Birds of Mich. The note originally related to the Goldfinch. 24. Wintering of the Red-headed Woodpecker at Detroit, Mich. Ibid, XX, 1905, 80. "In large numbers, at Belle Isle Park, Detroit." 25. Henslow's Sparrow in St. Clair Co., Mich. Ibid, 83-84. 26. Northern Parula Warbler in Southern Michigan. Ibid, 84. 27. Turkey Vulture in Michigan. Ibid, 413. One killed in Genesee county, April 27, 1905. 28. Additions and Additional Data to a Preliminary List of the Land

Birds of Southeastern Michigan. Wilson Bull. XVII, 1905, 108-114. 29. Late Canada Goose. Bull. Mich. Orn. Club, VI, 1905, 20. A flock of 21 seen near Lake St. Clair, April 30, 1905. 30. Hermit Thrush in Winter. Wilson Bull., XVIII, 1906, 26. 31. Three Michigan Records. Auk, XXIII, 1906, 100. Goshawk, Barn Owl, Saw-whet Owl. 32. The Carolina Chickadee in Southern Mich. Ibid, 342. Probably first specimen of the species taken in Mich. Collected July 17, 1899, in Wayne County. 33. Winter Notes from Detroit, Mich. and Vicinity. Wilson Bull., XX, 1908, 152-155. 34. Bubo virginianus occidentalis in Michigan. Auk, XXVII, 1910, 208. A specimen recorded from Ontonagon county, 1906, and now in the U. S. Nat. Museum. 35. Yellow Rail. Auk, XXIX, 1912, 100-101. One taken April 22, 1911, in Wayne county. 36. Duck Hawk. Ibid, p. 102. Four Mich. records of the species, the latest, at Grosse Point, July 15, 1911. 37. Carolina Wren. Ibid, p. 107. Several records for Grosse Isle and other points in Wayne County. 38. The Turnstone at Grosse Isle, Mich. Auk, XXVII, 1910, 452. 39. Nesting of Henslow's Sparrow on Grosse Isle, Mich. Auk, XXVII, 1910, 458. Nest with 4 eggs, May 31, 1909.

Swales, B. H. and Taverner, P. A.—1. Notes on several rare Southeast Mich. Birds. Auk, XXII, 1905, 88-89. White-winged Scoter, Surf Scoter and Short-billed Marsh Wren noted. 2. Recent Ornithological Developments in Southeastern Michigan. Ibid, XXIV, 1907, 135-148. Critical notes on 32 species, many of them rare.

Taverner, P. A.—1. The Tagging of Birds. Bull. Mich. Orn. Club, V, 1904, 50-51. 2. A discussion of the Origin of Migration. Auk, XXI, 1904, 322-333. 3. Description of Second Mich. Specimen of Cory's Least Bittern. Ibid, XXII, 1905, 77-78. 4. Additional Records for Southeastern Michigan. Ibid, 89. Clay-colored Sparrow, Lincoln's Sparrow, Prairie and Connecticut Warblers. 5. A Hyperlaken Migration Route. Bull. Mich. Orn. Club, VI, 1905, 1-7. 6. An Interesting Junco. Ibid, 20. A late specimen (April 30) at Pearl Beach, St. Clair Co., Mich., apparently sexless. 7. Rough-winged Swallows. Ibid, 21. A colony of six found in Wayne Co. 8. Bird Casualties. Wilson Bull., XVII, 1905, 131. 9. The Yellow-breasted Chat in Michigan. Ibid, XVIII, 1906, 17-21. 10. A Purple Martin Roost. Ibid, 87-92. (Roost in Trees in Washington Park, Chicago). 11. Some More Michigan Records. Auk, XXIII, 1906, 106-108. Notes on 3 species: Prothonotary Warbler (nesting), Hawk Owl at Port Huron, St. Clair Co., Great Blue Heron. 12. Southeastern Michigan Records. Ibid, 335. One Wilson's Phalarope and 3 White-rumped Sandpipers taken in Wayne Co. 13. The Year 1908 in Southeastern Mich. Wilson Bull. XX, 1908, 199-208. 14. Four Rare Birds in Southeastern Mich. Auk, XXV, 1908, 327-328. The species were: Yellow Rail, Caspian Tern, Bartramian Sandpiper and White Pelican. 15. Wilson's Phalarope and White-rumped Sandpiper in Wayne Co., Mich. Ibid, 328. 16. Two Michigan Records. Ibid, XXVI, 1909, 83. Specimens of Ardea caerulea and Buteo swainsoni, the former taken near Detroit, the latter near Mackinaw. 17. A Wood Ibis record for Michigan. Auk, XXVIII, 1911, 256. A young bird taken June 19, 1910, near Monroe, Mich. The first actual specimen recorded for the state.

Taverner, P. A. and Swales, B. H.—1. Lesser Snow Geese in Michigan and Ontario. Auk, XXIII, 1906, 219-220. One specimen of Chen hyperborea taken at St. Clair Flats, Nov. 5, 1905. 2. Notes on the Migration of the Saw-whet Owl. Auk, XXVIII, 1911, 329-334. Relates mainly to evidence found at Pt. Pelee, Ont., where 12 Saw-whets where found, Oct. 15, 1910. Two instances of migration in numbers over Lake Huron are also given.

Tinker, A. D.—1. The Black-crowned Night Heron in Washtenaw Co., Mich. Auk, XXV, 1908, 314, 315. A single specimen taken, the fourth record for the county. 2. Breeding of the Tufted Titmouse in Washtenaw Co., Mich. Ibid, 322-323. An adult seen taking food (insects) into a cavity in a dead branch 50 or 60 feet from the ground, May 24, 1908. Presumably this was the male taking food to his mate in the nesting hole. 3. The Carolina Wren in Washtenaw Co., Mich. Ibid, XXVI, 1909, 434. Nest with 5 young and 1 egg found June 20, 1909, near Ann Arbor. 4. Observations on the Spring Migration (1910) at Ann Arbor, Michigan. Wilson Bull. No. 74, March, 1911, 28-34. A compilation of records by Tinker, N. A. Wood and F. O. Novy. 5. The Birds of School Girl's Glen, Ann Arbor, Mich. Mich. Geol. & Biol. Surv., Pub. 1, Biol. Ser. 1, 1910, 35-66.

Trombley, Jerome.—1. Swallow-tailed Kite taken in Southern Mich. Bull. Nutt. Orn. Club, VII, 1882, 250.

Van Pelt, A. W.—1. Towhee Wintering in Muskegon County, Mich. Bull. Mich. Orn. Club, I, 1897, 45.

Van Winkle, E.—1. The Caspian or Imperial Tern. Oologist, X, 1893 114. 2. The American Herring Gull. Bull. Mich. Orn. Club, I, 1897, 33. Account of the nesting of this species and the Caspian Tern on certain islands of Delta county on the west side of Lake Michigan.

Wade, Joseph M.—1. Orange-crowned Warbler. Oologist, V, 1880. Note of capture in Michigan.

Walker, George H.—1. A Belated Meadowlark. Bull. Mich. Orn. Club, I, 1897, 24.

Warren, Harry S.—1. Ventriloquism in the Genus Spizella. Bull. Mich. Orn. Club, III, 1899, 7.

Washburn, F. L.—1. Recent Captures of Kirtland's Warbler in Mich., and Other Notes. Auk, VI, 279-280.

Watkins, L. Whitney.—1. And Perchers Swim Also. Nidiologist, II, 1894, 40. A wounded catbird taking to the water. 2. Notes on the Dickcissel. Ibid, III, 1895, 49-50. 3. Capture of Song Sparrow, Jan. 17, 1894, at Manchester. Also adult Goshawk taken at Norvell, Jackson Co., in January, 1897. Bull. Mich. Orn. Club, I, 1897, 23. 4. Mich. Birds that Nest in Open Meadows. First Rep. Mich. Acad. Sci., 1895 (1900), 66-75.

Weed, Clarence M.—1. Food Habits of Young Birds. Report of the State Board of Agriculture, 1883, 439-448. Part of thesis for M. S. degree. 2. The Food Relations of Birds, Frogs and Toads. Report of Mich Horticultural Society, 1884, 98. Part of thesis for M. S. degree.

White, Stewart Edward.—1. Brown Creeper at Grand Rapids, Mich. Ornithologist and Oologist, XV, 1890, 101-102. 2. Favors the Old Names, Ibid, 137. 3. Two days in the Field. Ibid, 173-174. Notes on the birds of Mackinac Island. 4. The Olive-backed Thrush. Ibid, XVII, 1892, 114-115. Notes from Kent County and Mackinac Island. 5. Birds Observed on Mackinac Island, Michigan, During the Summers of 1889, 1890 and 1891. Auk, X, 1893, 221-230. Includes notes by T. Gilbert White (brother) and Morris Gibbs. One hundred forty-four species listed, and four from neighboring mainland.

Widmann, Otto.—1. List of Birds Observed in the Neighborhood of

Wequetonsing, Emmet Co., Mich., July 9-23, 1901. Auk, XIX, 1902, 232-237. Notes on 73 species.

Wisner, Charles E.—1. Breeding of the Yellow-breasted Chat in Wayne Co. Bull. Mich. Orn. Club, IV, 1903, 57.

Wolcott, Robt. H.—1. Notes from Grand Rapids, Michigan. Ornithologist and Oologist, IX, 1884, 62. Refers to early spring birds. 2. Red-winged Blackbird and Cowbird. Bull. Mich. Orn. Club, III, 1899, 18. Cowbird eggs seldom or never found in nests of Red-winged Blackbird. 3. A Home Built on the Sands. Ibid, 20. Nest of Phoebe in a sand pit.

Wood, A. H.—1. The Black-backed Woodpecker. Ornithologist and Oologist, IX, 1884, 62. Species noted 30 miles north of Mackinaw.

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Bartramian Sandpiper in Wayne Co., Mich. Ibid, 473-474. Some details of nesting habits by James B. Purdy. 29. The Kirtland and Pine Warblers in Wayne Co., Mich. Ibid, 480. Records a single individual of each species, spring migrants. 30. Pine Siskins and Winter Bobolinks (near Detroit, Mich.). Ibid, XXVI, 1909, 192-193. 31. First Appearance of the Sanderling in the Vicinity of Detroit. Ibid, 427. 32. Warbler Notes from Wayne Co., Mich. Wilson Bull., XXI, 1909, 45, 46. 33. Baird's Sandpiper and Dickcissel in Wayne Co., Mich. Ibid, 107. 34. Rough-winged Swallow and Blue-gray Gnatcatcher Breeding in Wayne Co., Mich. Ibid, 108. 35. Some Winter Birds of the Season of 1908-1909 in Wayne Co., Mich. Auk, XXVII, 1910, 36-41. Thirty species noted, the Vesper Sparrow for the first time in winter in the county. 36. The Last Passenger Pigeons in Wayne Co., Mich. Ibid, 208. Three seen and one taken Sept. 14, 1898. (This is the specimen already several times recorded and now in the collection of J. H. Fleming, Toronto). 37. The Warblers in Wayne County, Mich., in 1909. Auk, XXVIII, 1911, 19-25. Notes on 26 species. 38. A New Breeding Record for Wayne Co., Michigan. Auk, XXVIII, 1911, 269-270. A nest of Mockingbird with three young found August 13, 1910.

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Wood, Norman A. and Gaige, Frederick.—1. Birds of the Sand Dune Region of the South Shore of Saginaw Bay. Mich. Geol. Surv., Pub. 4, Biol. Ser. 2, 1910, pp. 273-307.

Wood, Norman A. and McCreary, Otto.—1. An Unusual Bird Wave. Bull. Mich. Orn. Club, VI, 1905, 22-23.

Wood, Norman A. and Tinker, A. D.—1. Notes on some of the Rarer Birds of Washtenaw Co., Mich. Auk, XXVII, 1910, 129-141. Full notes on 34 species.

Wood, Walter C.—1. A Large Set of Grebe Eggs. Bull. Mich. Orn. Club, IV, 1903, 98. Nest of Pied-billed Grebe with ten eggs. 2. Notes on the Black Tern. Ibid, 28. Two females probably laying in same nest, several sets of 6 eggs each being found at St. Clair Flats. 3. Autumn Birds of Les Cheneaux Islands (Mich.). Wilson Bull., XVII, 1905, 48-50. Notes on 48 species. Period covered is Oct. 15 to Nov. 15, 1903. Logcock and Black-backed Woodpecker common, also Canada Jay. Raven nested regularly until 1900 in a big pine. 4. Additions to the Autumn Birds of the Les Cheneaux Islands (Mich.). Ibid, XIX, 1907, 27. Hudsonian Chickadee common.

APPENDIX 4.

GLOSSARY OF TECHNICAL TERMS.

Used in the Keys and Descriptions.

Many of the terms will be best understood by reference to the frontispiece, which shows the various parts of a bird and their names. The definitions quoted from Ridgway are from his Nomenclature of Colors (1886).

Abdomen. The belly.

Acuminate. Tapering gradually to a point.

Acute. Sharp-pointed.

Adult. Of breeding age, usually with the fully mature plumage.

Albinism. An abnormal condition of plumage, in which white replaces the ordinary colors.

Albino. A bird or other animal affected with albinism.

Albinistic. Affected with albinism.

Anal region. The feathers immediately surrounding the anus or vent.

Anterior. Forward; in front of.

Apex, Apical. The tip or point.

Aquatic. Living in, on or about water.

Ash-color. A shade of gray, ash-gray, bluish-gray.

Attenuate. Growing gradually narrower toward the tip, but not sharply pointed.

Auriculars. The feathers which cover the ears in birds; the ear-coverts.

Avi-fauna. The bird-life of a definite area.

Axillaries, Axillars. The elongated feathers growing from the axilla or armpit. (Fig. 52.)

Back. The dorsal region of the body, excluding neck and rump. It usually includes the scapulars and interscapulars, but should be restricted to the latter.

Band. A transverse mark or bar with nearly parallel edges. (A broad band is usually called a zone.)

Bar. A transverse mark. Narrower than a band, but wider than a line.

Bay. A very rich dark reddish chestnut (Ridgway).

Belly. The posterior ventral surface of the body, excluding the anal region.

Belt. A broad band of color across the breast or belly.

Belted. Marked with a broad band or belt.

Bend of the Wing. The carpal or wrist joint; the anterior point in the folded wing.

Boreal. Northern.

Breast. In birds, that part of the ventral surface which lies between the root of the neck and the abdomen.

Bristle. A small hair-like feather, most often seen near the angle of the mouth, or rictus.

Buff. A light brownish yellow, like "chamois skin."

Calcareous. Chalky; limy.

Carmine. A very pure and intense crimson. The purest of the cochineal colors (Ridgway).

Carpal. Pertaining to the wrist, or carpus.

Carpal joint. The wrist-joint, or carpus; the "bend of the wing."

Caudal. Relating to the tail.

Cere. The naked skin or membrane in which the nostrils are situated, found in most birds of prey. (Fig. 72.)

Cervical. Pertaining to the cervix or hind neck.

Cheek. A rather indefinite term applied to that part of the side of the head below eye and ear-coverts.

Chest. The upper breast; a somewhat indefinite area, part breast, part neck.

Chestnut. A rich dark reddish brown, of a slightly purplish cast (Ridgway).

Chin. The anterior point of the throat, often included between the branches of the lower jaw.

Cinereous. Ash-gray; a clear bluish gray color, lighter than plumbeous (Ridgway).

Cinnamon. The light reddish brown color of cinnamon bark.

Claw. The horny nail in which a toe ends.

Clay-color. A dull light brownish yellow color (Ridgway).

Clove Brown. The color of cloves.

Collar. A ring of color encircling the neck. (Fig. 58.)

Commissure. The line formed by the edges of the closed mouth (upper and lower jaw).

Compressed. Flattened from side to side; higher than broad. (Fig. 130.) The reverse of depressed.

Contour Feathers. The common feathers of the head, neck, and body which give shape to the bird; usually includes all but the flight feathers and down.

Crescentic. Crescent-shaped; new moon shaped.

Crest. A more or less lengthened tuft of feathers on top of the head, which usually can be raised or depressed at pleasure. (Fig. 98.)

Crested. Furnished with a crest (on the head, of course).

Crimson. Blood-red; the color of the cruder sorts of carmine (Ridgway).

Crown. The vertex; that part of the top of the head between the forehead and the occiput.

Culmen. The profile or upper outline of the upper mandible.

Cuneate. Wedge-shaped. (Fig. 66.)

Depressed. Expanded from side to side; broader than high. (Fig. 93.) Opposed to compressed.

Distal. Toward or at the extremity. Opposed to proximal.

Diurnal. Pertaining to the daytime.

Dorsal. Relating to the back.

Drab. A brownish gray color.

Dusky. A dark color of more or less indefinite or neutral tint (Ridgway).

Ear-coverts. The feathers overlying the ears of most birds; the auriculars.

Ear-tufts. Erectile tufts of elongated feathers springing from each side of the crown or forehead; plumicorns. (Plate 29.)

Elevated. Said of the hind toe, when it arises from the shank above the level of the front toes. (Fig. 61.)

Emarginate. With the margin cut away. (Fig. 73.) An emarginate tail has the middle pair of feathers shortest, the rest successively a little longer.

Falcate, Falciform. Shaped like a sickle or scythe.

Fauna. The sum total of the animal life of a country or region.

Fawn-color. A light warm brown color (Ridgway).

Filiform. Thread-like.

Flanks. The hindmost feathers of the sides.

Forehead, Front. The forepart of the top of the head, from the base of the bill to the crown.

Fore-neck. Usually refers to the throat but sometimes includes the chin, throat and chest.

Frontal. Pertaining to the forehead.

Fulvous. Like tanned leather; tawny.

Fuscous. Dark brown; smoky brown.

Gape. The opening of the mouth.

Glaucous. A whitish blue or whitish green color, like the "bloom" of a cabbage-leaf.

Gonys. The keel or outline of the lower mandible, from the tip to the point where the branches fork.

Gray. A mixture of black and white.

Greater Coverts. The hindmost series of wing-coverts, which immediately overlap the bases of the secondaries.

Ground-color. The main color of the general surface.

Gular. Pertaining to the throat.

Hair Brown. A clear, somewhat grayish tint of brown, resembling the "brown" hair of human beings; the typical brown color, composed of equal proportions of red and green (Ridgway).

Hazel. An orange-brown color, like the shell of a hazel-nut or filbert (Ridgway).

Heel. The tibio-tarsal joint; often mis-called the knee.

Hooded. Having the head conspicuously different in color from the rest of the plumage.

Immaculate. Unspotted, unmarked.

Immature. Not adult, though full grown.

Incubation. Brooding; the act of sitting on eggs.

Indigo Blue. A dark dull blue color, like indigo.

Inner Toe. The toe on the inner side of the foot, usually directed forwards.

Interscapulars. The feathers in the middle line of the back, between the scapulars.

Iridescent. With changeable colors or tints in different lights.

Iris. The colored circle of the eye surrounding the black center or pupil.

Jugulum. The lower throat or foreneck, immediately above the breast; the "chest" of some authors.

Knee. Properly the tibio-femoral joint, entirely hidden by the body feathers in most birds. Often improperly used for the heel joint.

Lamella. A thin plate or scale.

Lamellate. With numerous lamellæ or thin plates (leaves) as along the sides of a duck's bill. (Fig. 14.)

Lateral. Towards or at the side.

Lead-color. See plumbeous.

Leg. As generally used the same as tarsus or shank.

Lesser wing-coverts. The smaller wing-coverts, those covering most of the shoulder, or area in front of the middle coverts.

Linear. Line-like.

Lining of the wing. The under wing-coverts taken collectively.

Longitudinal. Running lengthwise of the body, or any part of it.

Loral. Relating to the lores.

Lores. The space between the eye and bill. (Fig. 36.) (Used only in the plural.)

Lower-parts, Under-parts. The entire under surface of a bird, from chin to vent.

Lower Tail-coverts. The feathers overlapping the base of the tail-feathers beneath.

Malar Region. The side of the lower jaw behind the horny covering of the mandible, usually feathered(Ridgway).

Mandible. The movable lower part of the bill; the lower jaw.

Mantle. Usually includes simply the back, scapulars, and upper surface of wings.

Marine. Relating to the sea.

Maroon. A rich brownish crimson; claret color.

Maxilla. The jaw; but properly the upper jaw only.

Superior and inferior maxillary refer respectively to upper and lower jaw (Ridgway).

Median, Medial. Along the middle line.

Melanism. A color condition resulting from excess of black or dark pigment.

Melanistic. Affected with melanism.

Middle Toe. The middle one of the three front toes.

Middle Wing-coverts. The coverts situated between the greater and lesser coverts.

Mirror. A name sometimes used for the speculum or metallic wing-bar of ducks.

Nape. That part of the hind-neck back of the occiput.

Nidification. Nest-building, or nesting habits.

Nuchal. Relating to the nucha or nape.

Nuptial plumes. Ornamental feathers acquired at the approach of the breeding season, and molted at its close.

Obscure. Indistinct, ill-defined.

Occipital. Relating to the hind-head, or occiput. (Fig. 36.)

Occiput. The back part of the head, directly in front of the nape.

Olivaceous, Olive. A greenish brown color, like that of olives.

Olive-green. A peculiar color, between olive and dull yellowish green (Ridgway).

Oological. Pertaining to oology, or the study of eggs.

Oology. The science of eggs.

Opaque. Dull, or without gloss.

Orbit. The region immediately around the eye.

Orbital Ring. A ring or circle of color immediately surrounding the eye. It may or may not be feathered.

Outer Web. That part of the vane or web of a feather which is farthest from the central line of the body. Usually it is narrower than the inner web.

Ovate, Ovoid. Shaped like a typical egg, one end larger than the other.

Pearl Gray. A very pale, delicate blue-gray color, like the mantle of certain gulls (Ridgway.)

Pectinate, Pectinated. Having tooth-like projections like the teeth of a comb, as the toes of the grouse (Fig. 62), and the middle claw in herons. (Fig. 37.)

Pectoral. Relating to the breast (pectus).

Perforate. Pierced through; said of nostrils which communicate with one another by reason of the absence of a septum. (Fig. 67.)

Pigment. Coloring-matter.

Piscivorous. Feeding upon fish.

Plumbeous. A deep bluish-gray color, like tarnished lead; lead-color.

Postocular, Postorbital. Back of, or behind the eye. Postocular is most used.

Powder-down Feathers. Peculiar, imperfect feathers, which grow in matted patches, usually on the spaces between the true feather-tracts; characterized by a greasy texture and scurfy exfoliation.

Primary. Any one of the quill feathers of the "hand-wing," or pinion, usually nine to eleven in number.

Primary coverts. The series of stiff coverts which overlie the bases of the primaries.

Pteryla. An area or tract of the skin on which feathers grow. A "feather tract."

Pterylosis. The plumage, considered with reference to its distribution on the skin.

Punctate. Dotted.

Pupil. The central black (or dark blue) spot or disk of the eye, enclosed within the iris.

Quill. Sometimes applied to one of the primary feathers; strictly, the hollow part of the shaft of a feather.

Ramus. A branch or fork, as the ramus of the lower mandible.

Rectrix. One of the tail-feathers. (Used chiefly in the plural, rectrices).

Remex. Any one of the longer flight feathers. (Used mainly in the plural, remiges).

Reticulate. Netted. Said of a tarsus covered with small, irregular plates, giving a netted effect. (Fig. 56.)

Rictal. Pertaining to the rictus.

Rictus. The gape; the edges and corner of the mouth.

Rounded. A rounded tail has the central pair of feathers longest, each successive pair a little shorter.

Rufous. A brownish red color; rust red.

Rump. That part of the back lying directly in front of the upper tail-coverts.

Russet. A bright tawny-brown color, with a tinge of rusty. (Ridgway.)

Scapular Region. The longitudinal area of feathers, usually well defined, overlying the shoulder blade on each side of the back.

Scapulars. The feathers of the scapular region.

Scutellate. Covered regularly and more or less completely with horny plates or shields known as scutella, or scutes. (Fig. 54.)

Scutellum. A scute or plate. The singular of scutella.

Secondary Coverts. The greater wing-coverts.

Secondaries. The flight feathers of the forearm, which are borne on the ulna.

Semilunar. Shaped like a half-moon.

Semipalmate. Half-webbed; the webs between the front toes reaching not more than half-way to their ends.

Serrate. Saw-toothed.

Setaceous. Bristly, bristled.

Shaft. The mid-rib or horny axis of a feather, especially the solid part.

Sides. The lateral areas of the lower surface of a bird's body, extending from the axilla to, and including, the flanks.

Sinuate. Applied to a feather whose edge is cut away less abruptly than when emarginate.

Slate-color. A dark gray, or blackish gray color, less bluish in tint than plumbeous or lead-color (Ridgway).

Speculum. A mirror-like, metallic, or brightly colored area on the wing of certain ducks. (Fig. 13, p. 78.)

Spurious. Rudimentary.

Spurious Primary. The first primary, when very small. Usually also misplaced, that is placed on the inner side of the wing, under the next primary.

Streak. A narrow color-mark, running lengthwise of the bird or feather.

Stripe. A broad color mark running lengthwise of bird or feather.

Sub-caudal. Under the tail.

Sub-orbital. Below the eye.

Sub-species. Usually a geographical race, or form; perhaps an incipient species.

Sulphur Yellow. A very pale pure yellow color, less orange in tint than dilute gamboge or lemon-yellow (Ridgway).

Superciliary. Above the eye. A superciliary streak usually extends from the base of the upper mandible over the eye, and backward above the ear-coverts to the sides of the occiput.

Superior. Upper; topmost or uppermost.

Supraloral. Above the lores.

Supra-orbital. Above the eye.

Tail-coverts. The hindmost body feathers; those which cover the base of the tail, above and below.

Tarsus. The leg of a bird, from the toes to the heel joint; the shank.

Tawny. The color of tanned leather.

Terminal. At the end or tip.

Tertials, tertiaries. The inner secondaries, especially when of different color, size, or shape, from the rest.

Throat. The upper part of the foreneck, not including the chin.

Tibia. The section of the leg next above the tarsus; the "drumstick" of a fowl.

Tibial. Belonging to the tibia.

Tomia. The cutting-edges of the mandibles.

Transverse. Crosswise, or at right angles to the axis of the body or feather.

Truncate. Cut squarely off.

Under-parts. The entire lower surface of a bird, from chin to vent. (Same as lower-parts.)

Under Tail-coverts. The feathers covering the base of the tail below.

Under Wing-coverts. The coverts of the under surface of the wing; the wing-lining.

Upper-parts. The entire upper surface, from forehead to tail.

Upper tail-coverts. The feathers overlying the base of the tail above.

Vane. The whole of a feather excepting the shaft and quill; the web.

Vent. The anus.

Vermiculate. Marked with fine wavy lines, like worm-tracks.

Vernal. Pertaining to spring.

Vertex. The crown, or central portion of the top of the head.

Vinaceous. A brownish pink, or delicate brownish purple color (Ridgway).

Washed. Thinly overlaid with a different color.

Web. The vane of a feather, exclusive of the shaft. The outer web is commonly narrower than the inner web.

Zone. A broad band of color, completely encircling the body of a bird.

APPENDIX 5.

OUTLINE OF CLASSIFICATION OF NORTH AMERICAN BIRDS.

From the second edition of the Check List of North American Birds prepared for the American Ornithologists' Union.

Order I. PYGOPODES, Diving Birds.

Family 1. **Colymbidæ,** Grebes.
Family 2. **Gaviidæ,** Loons.
Family 3. **Alcidæ,** Auks and Murres.

Order II. LONGIPENNES, Long-winged Swimmers.

Family 4. **Stercorariidæ,** Gull-chasers.
Family 5. **Laridæ,** Gulls and Terns.
Family 6. **Rynchopidæ,** Skimmers (not found in Michigan).

Order III. TUBINARES, Tube-nosed Swimmers (not found in Michigan).

Family 7. **Diomedeidæ,** Albatrosses (not found in Michigan).
Family 8. **Procellariidæ,** Fulmars, Shearwaters, and Petrels (not found in Michigan).

Order IV. STEGANOPODES, Totipalmate Swimmers.

Family 9. **Phaethontidæ,** Tropic-birds (not found in Michigan).
Family 10. **Sulidæ,** Gannets.
Family 11. **Anhingidæ,** Darters (not found in Michigan).
Family 12. **Phalacrocoracidæ,** Cormorants.
Family 13. **Pelecanidæ,** Pelicans.
Family 14. **Fregatidæ,** Man-o'-War-Birds (not found in Michigan).

Order V. ANSERES, Swans, Ducks and Geese.

Family 15. **Anatidæ,** Swans, Ducks and Geese.

Order VI. ODONTOGLOSSÆ, Lamellirostral Grallatores (not found in Michigan).

Family 16. **Phoenicopteridæ,** Flamingoes (not found in Michigan).

Order VII. HERODIONES, Herons, Ibises, Storks.

Family 17. **Plataleidæ,** Spoonbills (not found in Michigan).
Family 18. **Ibididæ,** Ibises.
Family 19. **Ciconiidæ,** Storks and Wood Ibises.
Family 20. **Ardeidæ,** Herons, Bitterns, etc.

Order VIII. PALUDICOLÆ, Marsh-dwellers.

Family 21. **Gruidæ,** Cranes.
Family 22. **Aramidæ,** Courlans (not found in Michigan).
Family 23. **Rallidæ,** Rails.

Order IX. LIMICOLÆ, Shore Birds.

Family 24. **Phalaropodidæ,** Phalaropes.
Family 25. **Recurvirostridæ,** Stilts and Avocets.
Family 26. **Scolopacidæ,** Snipe, Sandpipers, etc.
Family 27. **Charadriidæ,** Plover.
Family 28. **Aphrizidæ,** Surf Birds and Turnstones.
Family 29. **Haematopodidæ,** Oyster-catchers (not found in Michigan).
Family 30. **Jacanidæ,** Jacanas (not found in Michigan).

Order X. GALLINÆ, Fowl-like Birds.

Family 31. **Odontophoridæ,** Bob-whites, Quails, etc.
Family 32. **Tetraonidæ,** Grouse, Spruce Partridges, Ptarmigans, etc.
Family 33. **Meleagridæ,** Turkeys.
Family 34. **Cracidæ,** Curassows and Guans (not found in Michigan).

Order XI. COLUMBÆ, Pigeons and Doves.

Family 35. **Columbidæ,** Pigeons and Doves.

Order XII. RAPTORES, Birds of Prey.

Family 36. **Cathartidæ,** American Vultures.
Family 37. **Buteonidæ,** Hawks, Eagles, Kites, etc.
Family 38. **Falconidæ,** Falcons, Caracaras, etc.
Family 39. **Pandionidæ,** Ospreys.
Family 40. **Aluconidæ,** Barn Owls.
Family 41. **Strigidæ,** Horned Owls, etc.

Order XIII. PSITTACI, Parrots, Macaws, Paroquets, etc. (not found in Michigan).

Family 42. **Psittacidæ,** Parrots, Macaws, and Paroquets.

Order XIV. COCCYGES, Cuckoos, etc.

Family 43. **Cuculidæ,** Cuckoos, Anis, etc.
Family 44. **Trogonidæ,** Trogons (not found in Michigan).
Family 45. **Alcedinidæ,** Kingfishers.

Order XV. PICI, Woodpeckers, Wrynecks, etc.

Family 46. **Picidæ,** Woodpeckers.

Order XVI. MACROCHIRES, Goatsuckers, Swifts, etc.

Family 47. **Caprimulgidæ,** Goatsuckers, etc.
Family 48. **Micropodidæ,** Swifts.
Family 49. **Trochilidæ,** Hummingbirds.

Order XVII. PASSERES, Perching Birds.

Family 50. **Cotingidæ,** Contingas (not found in Michigan).
Family 51. **Tyrannidæ,** Tyrant Flycatchers.
Family 52. **Alaudidæ,** Larks.
Family 53. **Corvidæ,** Crows, Jays, Magpies, etc.
Family 54. **Sturnidæ,** Starlings (not found in Michigan).
Family 55. **Icteridæ,** Blackbirds, Orioles, etc.
Family 56. **Fringillidæ,** Finches, Sparrows, etc.
Family 57. **Tangaridæ,** Tanagers.
Family 58. **Hirundinidæ,** Swallows.
Family 59. **Bombycillidæ,** Waxwings.
Family 60. **Laniidæ,** Shrikes.
Family 61. **Vireonidæ,** Vireos.
Family 62. **Cœrebidæ,** Honey Creepers (not found in Michigan).
Family 63. **Mniotiltidæ,** Wood Warblers.
Family 64. **Motacillidæ,** Wagtails.
Family 65. **Cinclidæ,** Dippers (not found in Michigan).
Family 66. **Mimidæ,** Thrashers, Mockingbirds, etc.
Family 67. **Troglodytidæ,** Wrens.
Family 68. **Certhiidæ,** Creepers.
Family 69. **Sittidæ,** Nuthatches.
Family 70. **Paridæ,** Titmice.
Family 71. **Chamæidæ,** Wren-tits (not found in Michigan).
Family 72. **Sylviidæ,** Warblers.
Family 73. **Turdidæ,** Thrushes, Bluebirds, etc.

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